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33213

PREFACE.

In offering this little Compend to Medical Students, it may be well to observe that it has been compiled with care, from the standard authorities on Surgery, and from the notes of the Writer, taken whilst he was himself an attendant upon the lectures on the subjects of which it treats.

He trusts that it will be found acceptable to those whom it is designed to serve, and that it will supply a want that is supposed to exist.

ORVILLE HORWITZ.

PREFACE TO THE SECOND EDITION.

The favor with which this volume has been received by Medical Practitioners and Students, makes it necessary to prepare a second edition for the press; and in doing so, the writer, not unmindful of the kindly criticisms that the profession has bestowed upon the work, has endeavored to show his appreciation of its reception by its careful revision, and by adding much new matter; especially upon the subjects of ulcers, venereal diseases, wounds, their antiseptic treatment, and the ligation of arteries.

Many additional illustrations have also been added.

January 1, 1885. *1919 Walnut Street, Philadelphia.*

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INFLAMMATION.

Definitions.—"Inflammation may be defined to be a perverted action of the capillary vessels, and of the perivascular tissues, attended with discoloration, pain, heat, swelling, and disordered function, with a tendency to effusion, deposits or new products."—*Gross' System of Surgery.*

"Inflammation is a concrete term, designed to express the totality of several distinct processes, and therefore incapable of being defined by any single word. It is sufficient for our purposes to say that it is a form of *hypernutrition.*"—*Agnew's Principles and Practice of Surgery.*

"Inflammation is that nutritive disturbance which is characterized by active hyperæmia or congestion, and active multiplication or proliferation of the cells of a tissue or organ."—*Professor S. W. Gross.*

Symptoms. A part is said to be inflamed, which presents the four symptoms, pain, heat, redness and swelling, with loss of function of the part affected.

Pain may vary with the local *cause* which has produced it; every idiopathic inflammation has its own kind of pain. The pain will vary with the *part* inflamed; each part has a set of sensations peculiar to itself; thus, the bones and ligaments ache; the skin smarts or burns; an inflamed pleura feels as if torn or stabbed; there is sickness in peritonitis, abnormal sounds in inflammation of the ear, and flashes of light in ophthalmia.

Inflammatory pain is accompanied by internal irritability, and tenderness is created.

In inflammation of dense, unyielding parts, or parts confined by fascia, the pain is throbbing; intense pain is caused by *distention* from exudation.

Pain may be felt at a distance along the course of irritated nerves.

And pain may be absent in some cases, even though much disease exist.

Heat. The patient feels that the inflamed part is hot, and if it be an external part the thermometer shows that it is hotter than the neighboring sound parts.

Redness is a consequence of the hyperæmia, and its appearance depends, in some degree, on the natural arrangement of the vessels of the part.

The *swelling* is caused, first by the hyperæmia, then by cell growth and matters exuded into the inflamed tissue.

Inflammation, of course, impairs function. Motion is difficult or impossible, sensation is exaggerated; secretion is diminished, and secreted liquids are mixed with blood or serum, or fibrinous flakes.

Symptomatic fever is that which accompanies local inflammation following an injury.

Symptoms. *Shivering.* This is a sensation of cold, as of cold water trickling down the back, with trembling of the muscles; in severe cases there is blueness of the extremities, and other signs of chill. It is a most important symptom at any stage of any disease; vomiting is sometimes combined with it.

The *pulse* is raised to 100, 120, or more. It may be hard and wiry or soft and jerking.

The *respiration* is also increased to 25 or 30 per minute in adults, and in children to double that number.

The *heat* of the blood is raised to 102°–104°. The heat usually attains its height on the first or second day of the fever; above 104° fever is severe, above 107° it becomes what is known as *hyperpyrexia*.

It may cease abruptly on the opening of an abscess, the removal of a ligature, or other source of irritation.

All the watery *secretions* are diminished. Food is loathed, but acid and water craved.

Headache and lassitude are always present.

The urine is usually scanty and high colored at the height of the symptoms; toward the close it is copious and turbid, with the sediments of lithates. As a rule, the uric acid, extractive matters and specific gravity of urine are greatly increased during acute inflammation.

The type of the attendant fever varies, being of the sthenic character in young and robust individuals, and in the earlier stages, while it is of the asthenic variety in the feeble and aged.

Inflammation is extended by continuity; by contiguity of structure; by the veins and lymphatics; by nervous agency, and by the blood.

Varieties. Acute and chronic.

An acute attack runs its course swiftly, and is characterized by well-marked symptoms. Chronic inflammation is marked by slowness and feebleness of action; the attendant phenomena are less bold, although there is usually a decided tendency to effusion.

Inflammation is denominated subacute when it is comparatively mild, or indisposed to either advance or recede, when there is little or no pain and no marked constitutional symptoms. It may be *healthy* or *unhealthy*, according as it manifests a tendency to restoration to health, or the reverse.

Irritable does not differ materially from unhealthy inflammation; it arises from an exalted sensibility of the structures involved, and is aggravated by an unsound state of the nervous system.

Inflammation is termed *latent* when it is not revealed by the ordinary phenomena; this condition is always feared by the surgeon, on account of the extreme liability to its being overlooked. Abscess of the spine gives a good illustration of this form, where great havoc is often produced before the real nature of the disease is suspected.

Again, inflammation may be *common* or *specific;* it is common when it proceeds from ordinary causes; specific, when it is produced by some peculiar poison, as that of smallpox or syphilis.

INTIMATE NATURE OF INFLAMMATION.

"The essential elements of the inflammatory process are, slight contraction of the capillaries, with retardation of the flow of blood; dilatation of these vessels, and an increased rapidity of the circulation; exudation of the blood liquor and emigration of white blood corpuscles, and a quiescent state of the capillaries, with complete stagnation of the contents. While these changes are going on in the interior of these vessels, important changes are wrought in the blood, both in regard to its consistence, its color, the arrangement of its globules and the character of the plasma." *

The blood vessels become dilated; the blood corpuscles circulate with great rapidity, while the white globules loiter along the sides; inflammation proceeds; the red corpuscles are seen to move slowly along the centre, while the white corpuscles accumulate in great numbers against the sides of the vessels' walls.

Then follows migration; the white blood corpuscles, by their amœboid movements, insinuate themselves through the walls of the vessels, to accumulate in great numbers in the inflamed tissues; the fixed corpuscles of the tissues then proliferate and add to the number of bioplasts in the interstices. The ancient tissue is transformed into embryonic tissue; this is denominated, by Cornil and Ranvier, "inflammatory new formations."

---

* Gross' System of Surgery.

Blood, Buffed and Cupped. When blood is drawn during inflammation its surface soon becomes covered with a bluish layer. As soon as the blood is coagulated, this layer is exhibited as a buff-colored stratum on the surface of the red clot. As the "buffy coat" generally contracts, so as to render the upper surface concave, the blood used to be called "buffed and cupped."

This state of the blood is found in most inflammations, especially in acute rheumatism, pleurisy and pneumonia; it is also found in erysipelas, phthisis and pregnancy. This condition is known by the name of hyperinosis; it is not found in typhoid or typhus fever, nor in the exanthemata.

Chemically speaking, the blood, during inflammation, is starved, oxydized, and its albumen converted into fibrinogenous matter.

PROGRESS AND TERMINATIONS.

Resolution. Inflammation may end in resolution; the hyperæmia subsides, the interstitial leucocytes cease to receive pabulum and to grow, and the part returns to its former condition of health. The temperature falls to 98°; sleep, appetite and moisture of the skin return, and the part resumes its former condition of health.

Organization. Whilst the hyperæmia subsides, the effused bioplasm may not be absorbed, but remain, constituting the *adhesion* of serous membranes, or cicatricial tissue, or the starting point of granulation.

Suppuration. Under the influence of continued hyperæmia and irritation the exuded bioplasts become pus, which, in the interstices of a tissue, forms an *abscess*.

Ulceration. Tissue, softened, starved and eroded by intrusive bioplasts, melts away, forming an ulcer, through which the abscess discharges itself.

Gangrene. Loss of life of the whole or portions of the affected part may ensue, from obstruction to the circulation.

Serous effusion and hemorrhage, with the foregoing four conditions, are spoken of as *terminations of inflammation.*

CAUSES OF INFLAMMATION.

The causes of inflammation are *local* and *constitutional.*

Local. Over-exertion is most effective; alternations of heat and cold, which disturb the chemical changes going on between the blood and the tissues; injuries of every variety; zymotic poisons and disease germs; transplantation of epithelial cells, undergoing change, as gonorrhœa; original mal-development.

Constitutional. The blood may be too abundant, or overcharged with material prone to decomposition. Every blood poisoning has its favorite seat of action, more particularly those consisting of degenerate germinal matter, as the poisons of smallpox, scarlatina, syphilis, etc.

Cold is a frequent cause of inflammation. It checks the secretion of the skin and deranges the chemical actions going on in the blood.

Embolism. The transplantation of venous clots, or of concretions from the heart. Clots from the veins, after parturition or severe injury, or clots which form in limbs, may find their way to the heart, and if not long enough to block up the pulmonary artery may be carried on to the lung and create disease.

Treatment. *Bloodletting* stands at the head of the list of remedies; by diminishing the mass of blood, the labor of the heart and lungs is diminished, and the remaining blood is allowed to be oxygenated and purified by natural influences. The blood should be drawn as quickly as possible, and from a large orifice; it should be permitted to flow till paleness of the lips, lividity about the eyes, sighing, nausea, fluttering pulse and relief of pain indicates the *approach* of faintness.

Fifteen ounces is the average amount required to produce this effect, but in robust individuals larger quantities may be taken.

The class of persons it is allowable to bleed are the robust, with red lips and firm muscles; if the lips and conjunctivæ are pale, if there be weakness or degeneration of the heart, Bright's disease, scrofula, etc., bleeding is to be avoided.

The local means of abstracting blood are by leeches, cupping and scarifications.

Cold is a valuable means of diminishing afflux of blood and morbid heat. It may be applied by *evaporation* or by *evaporating lotion;* dry cold may be applied by means of india-rubber bags or bladders filled with ice. Dry cold applications are less irritating than wet.

Cathartics are important remedies in the treatment of inflammation.

Mercury is in universal use as an antiphlogistic.

Tartar emetic may be used as a depressant, or in emetic doses.

Aconite and veratrum viride are powerful antiphlogistics.

Counter irritation, as blisters, in recent inflammation, is very beneficial.

In treating inflammation our remedies should be applied with a view to removing the cause of the disease; to purifying the blood; to soothing the disturbance of the vitality of the part; to moderating the afflux of the blood; to hindering degeneration in the fluids exuded, and procuring their absorption; and finally, to maintaining the strength of the patient.

SUPPURATION AND ABSCESS.

Suppuration is the formation of pus in a part.

Symptoms. The formation of pus is often attended with severe constitutional irritation; there are rigors succeeded by heat, and if the inflammation be extensive, or seated in any vital organ, the constitutional disturbance will be very severe, and the shivering, which indicates the formation, will also be severe, and followed by powerful reaction. When the pus is easily produced there may be little or no rigor; as upon a mucous membrane.

When matter is being produced there is an unusual sensation of uneasiness in the part, together with a blush on the skin; as this continues, the tumor becomes soft in the middle, but remains hard on the sides; the centre becomes elevated, and upon pressure fluctuation will be apparent.

Pus is usually formed in from seven to fourteen days, but the time will vary much with the constitution of the patient and the structure of the part on which the inflammation is seated.

Pus consists of serum, holding myriads of leucocytes and masses of bioplasm in suspension.

Pus is a yellowish-white, opaque fluid, of the consistence of cream, free from smell, slightly alkaline, of a sweetish taste, insoluble in water; its usual specific gravity is 1.021–1.040; heat coagulates the albuminous elements of its serum; potassa and ammonia convert it into a gelatinous mass.

It contains water, fat, albumen and animal matters; also salts in which are a notable quantity of potassa.

It may be mixed with more or less puriform fluid, such as is yielded by unhealthy abscesses.

Where pus is formed under fascia, or deep in the mamma or pelvis, and cannot make its way to the surface, the pain is not relieved by the increase of distention, and the constitutional symptoms are much more severe. The tendency of abscesses is toward the skin, though they may burst into serous cavities or mucous canals.

Treatment. Remove, if possible, the morbid condition of the constitution on which the disease depends; gentle purgatives may be useful, and exciting causes, such as thorns, splinters, etc., should be removed.

Poultices are highly beneficial; they relax the skin, soothe the pain, and encourage the formation of pus.

Good substitutes for poultices are warm water dressings and the *spongiopiline.*

Abscesses should be opened if they enlarge in breadth and circumference, and tend to burrow; when pus forms beneath fascia and other dense ligamentous textures, such as the sheaths of tendons; when they are caused by the extravasation of urine or other irritant fluids; when an abscess is formed in loose areolar tissue, as around the anus; in suppuration near a joint, or in the parietes of the chest or abdomen, into which the matter might pass, or where it might cause compression of, or burst into, the trachea, œsophagus or jugular veins; in suppuration of very sensitive organs, as the testis, or under deep fascia of the neck; when it is desirable to avoid a scar in the face and neck.

The poultice may be continued until the pain has ceased; it will then be proper to apply a compress of linen or cotton wool and strips of adhesive plaster or bandage, to bring the sides of the cavity together.

If suppuration continues profuse, tonics, good diet, change of air, etc., are advisable.

HECTIC FEVER.

Hectic Fever is a form of remittent fever, consisting of an exacerbation, once, or sometimes twice a day; depending on either suppuration, or upon important organic derangement of structure.

Symptoms. One of the first symptoms is a slight increasing frequency of pulse, and a small degree of heat of skin, generally toward evening, becoming more and more pronounced as the disease advances, and subsiding before the beginning of next day. The heat is especially felt in the palms of the hands and the soles of the feet.

The exacerbation reaches its height about midnight and terminates by a profuse perspiration toward morning.

The heat of skin during the paroxysm is often considerable and always distressing, so that very little covering can be endured. The respiration is quick and short. The appearance of the face is characteristic; there being a circumscribed blush in the centre, known as the "hectic flush." The patient loses flesh rapidly. The pulse is above 80 and is soft. The temperature varies from 99° to 101°, and rises higher when symptoms of dissolution come on.

If the fever arise from local disease it may cease at once on the removal of the cause; if otherwise, the diarrhœa and perspiration become more and more exhausting, and the patient sinks.

Causes. Surgically speaking suppuration is the great cause; for in this case hectic will depend upon the absorption of poison from the decomposing pus, and the perspiration and diarrhœa are the means employed by nature to eliminate it.

Treatment. Remove the local disease, if possible; this may be done by letting out pus, removing diseased part, or resorting to such other operation as may be necessary.

Support the strength by good, nourishing diet, animal and farinaceous food, eggs, maccaroni, milk, wine, beer, etc.

Quinine, sulphuric acid and iron are the medicines generally indicated.

Diarrhœa is best combated by selected diet, aromatic sulphuric acid; small doses of opium; chalk mixture, etc., etc.

Night Sweats. Sponge surface with cold water, or alum and water. Give aromatic sulphuric acid, gtt. xv t. d.; or atropia sulph., an eightieth of a grain; or extract belladonna, half a grain, combined or not with oxide of zinc, two or three grains, at bedtime.

SEPTICÆMIA.

Septicæmia is a morbid condition due to the absorption of purulent and other productions of any animal matter within the body in a state of decomposition.

Symptoms. The disease begins with a well marked chill, followed by fever, which is succeeded by a sweating stage. There is great muscular weakness, delirium, dyspnœa, vomiting and diarrhœa, with sallow skin. The temperature varies with the gravity of the case; the maximum in mild cases will be about 103° Fahr., whilst in grave cases it may reach 108° Fahr.

Congestion of the lungs is one of the principal lesions of persons dying of septicæmia.

The prognosis is very grave; of the fatal cases, one-half die within four days from the commencement of the attack, and four-fifths of those attacked within the first eight days.

PYÆMIA.

Pyæmia is a febrile affection, resulting in an admixture of purulent matter or pus with the blood.

The disease begins with shivering, rapid pulse, anxious countenance, weight about the heart, dry tongue, sallow skin, headaches and nausea. One of the most prominent symptoms is the production of profuse suppuration. The most striking effects are collections of either purulent or puriform matter, varying in size. Multiple abscesses are frequently found in different organs, especially the lungs and liver; also in the kidneys and within the joints.

Prognosis. Serious, usually fatal. Repeated shiverings are the very worst omen. A temperature of or above 106° is very unfavorable.

Treatment. The indications are to remove the exciting cause of the disease, to purify the blood, and keep up the strength of the patient.

It may be well to begin with a calomel purge, when general indications warrant it. The attention of the surgeon should at once be turned to the necessity of keeping up the strength of his patient, and tonic treatment should be early resorted to. Quinine, with or without iron, should be administered. When suppuration is established Huxham's tincture of bark and aromatic sulphuric acid are the remedies, and sleep must be procured by opiates. Brandy or whisky, port or sherry wine, beef tea, milk, eggs, and such articles as will keep up the strength of the patient, are early indicated.

Cleanliness must be insisted upon, and great good will be attained by diligent and unfailing attention to the dressings.

Detergent lotions containing chlorinated sodium, carbolic acid or chloride of zinc, are serviceable.

The position of the part should be so arranged as to favor the escape of the secretions.

If abscesses form, early and free incisions must be made.

Should hemorrhage exist, muriated tincture of iron is a remedy to be resorted to; it should be given in doses of 20 to 30 drops, every four hours. Ergot or atropia, combined with the iron or given separately, will be found valuable in allaying the copious sweating that is apt to exist in this disease.

The treatment relied upon in pyæmia is to be resorted to in septicæmia.

ULCERS.

An Ulcer is a solution of continuity in any of the soft parts of the body, attended with inflammation and a discharge of pus, ichor or sanies.

Professor S. D. Gross divides ulcers into *acute* and *chronic*, according to the intensity and rapidity of the morbid action, and Professor Agnew's division is into *local* and *constitutional.*

The ordinary ulcer may have begun as a wound or bruise, abscess or other disease or injury; the granulations are small, numerous, florid and pointed, and yield a moderate secretion of healthy pus.

Cicatrization begins with an absorption of swelling around the wound, and a contraction of its margin; its edge begins to look smooth and bluish, and a thin pellicle of new cuticle gradually spreads from the edge, in a converging circle, till the wound is closed. An *acute ulcer* is distinguished by the rapidity of its progress and the severity of its symptoms.

The pain is often a prominent symptom; it varies in character, being sometimes throbbing and again sharp and pricking, dull, heavy and gnawing.

When the ulcerative action is rapid and extensive, there is more or less fever, with thirst, restlessness, loss of sleep and excitement of the pulse.

The tissues most disposed to ulceration are the skin and mucous membranes; the areolar tissue ulcerates very easily; muscles, blood vessels and nerves, very slowly; tendons and ligaments are very slow to ulcerate; but cartilage, bone and the cornea are sometimes extremely liable to it.

Weak and cachectic constitutions are most liable to ulceration. The parts usually affected are those where the circulation is most weak and languid; such as the legs, especially if the veins be varicose.

The chronic ulcer has its surface smooth and glassy, more or less irregular, and is of a pale ashy color; sometimes it displays a crop of weak granulations; the edges are raised, thick, white, hard, or callous and insensible; in some cases they are thin, ragged and serrated, the discharge being scanty and thin.

Ulcers are frequently stationary for a great length of time, and from slight causes may enlarge rapidly, by ulceration or sloughing; and even when they have made considerable progress in healing, they may, without any manifest reason, quickly retrograde.

A fistula or sinus is a narrow channel, lined by a pseudo-mucous membrane, which may or may not lead to a suppurating cavity.

A varicose ulcer is one that is seated on a leg whose veins are varicose.

Treatment. In acute ulcers the patient should be kept in bed, with the limb raised on a pillow; saline purgatives must be administered. Calomel or blue mass should be combined with the saline cathartic. Pain must be relieved by opiates. Soothing applications, such as poppy lotion, or acetate of lead and opium, should be resorted to; cold or warm lotions, as are most agreeable, should be applied.

In many cases a tonic and stimulating treatment will be better suited to the patient; when resorted to, quinine and iron are the remedies most in vogue, and a diet nutritious and generous must be added.

If the inflammation runs high, it is well to draw blood by scarification. "From six to a dozen vertical incisions, not quite skin deep, being made over the inflamed surface around the sore, the blood is permitted to flow until the patient shows signs of approaching syncope, if he be at all plethoric, or, at all events, until the engorged vessels have been thoroughly unloaded, as denoted by the comparative pallor of the part."

In the early stages of the disease water dressing medicated with carbolic lotion should be used; when the discharge becomes healthy, pieces of lint saturated with the lotion should be laid on the sore; then strips of adhesive plaster should be applied *two-thirds around the limb*, from an inch below the ulcer to an inch above it; the plaster should be so applied that the edges of the sore may be drawn together with a moderate degree of force; then a compress of soft linen should be placed over the plaster, and finally the limb should be bandaged from the toes to the knee. The parts should be kept clean and washed every day with soap and water.

For the treatment of chronic ulcers all the mineral and vegetable astringents may be tried in turn: mercury, tannin, catechu, zinc, iron, copper, alum, silver; for general use, sulpho-carbolate of zinc is one of the best; it contains the astringency of the zinc, with the antiseptic virtues of the carbolic acid. For reducing thick, callous edges, ointments of nitrate of mercury and nitrate oxide of mercury are greatly praised. Acid nitrate of mercury, diluted with eight or ten parts of water, is highly recommended. Fetor is allayed with the chlorides.

The treatment of varicose ulcers and of chronic ulcers generally by the use of Baynton's plan of inclosing the limb in strips of adhesive plaster, regularly applied from the foot upward, has long been in use. Professor S. D. Gross gives the preference to the elastic bandage recommended by Dr. Henry A. Martin, of Boston.

In varicose ulcers the destruction of the affected vessels by Vienna paste or by ligation may be necessary.

If the ulcer depends upon necrosed bone, it must be extracted, and any carious bone should be scraped away, or removed with the chisel, gouge or scalpel.

Sinuses are to be laid open with the bistoury, guided by the director.

HOSPITAL GANGRENE.

Hospital gangrene is a severe ulceration, in which there is copious exudation and infiltration of the affected part, together with rapid decomposition; it arises where a number of sick and wounded men are crowded in ill ventilated apartments, who are deprived of nourishing food, and where there is no opportunity for separating the infected. It may affect any kind of a wound, or even a mere bruise.

Hospital gangrene may be divided into idiopathic and traumatic; it is idiopathic when it depends upon constitutional causes, and traumatic when it has its origin in an external injury.

Symptoms. When the disease ensues from a wound, an ulcer, or on the stump of an amputated limb, the part begins to be painful, the edges inflame, the suppuration becomes less and of a serious character, the granulations assume a dark and foul appearance, and are rapidly destroyed; a quantity of lymph, of a grayish appearance, covers the sore; the wound increases in all directions; the edges become painful and œdematous, and the œdema spreads. The disease begins with pain, which is constant and excessive, being sharp and stinging; cavities are observed more or less deep, the edges being covered with pus. These ulcerous spots increase and run together; a bloody, ichorous fluid is secreted, and the surface enlarges in all directions. The destruction is often restricted to the cellular tissue, but frequently the muscles and all surrounding parts are destroyed.

Bleeding sometimes occurs from the destroyed vessels. When suppuration takes place the discharge is abundant and highly fetid.

These local symptoms are accompanied by loss of appetite, pain in the region of the stomach, nausea, costiveness, loss of sleep, quick and generally a weak pulse, hot skin, anxiety and restlessness.

Its characteristic is quick extension and decomposition of the tissues.

The contagion develops itself usually in hospitals, where the air is deteriorated, where patients are huddled together, and where attention to cleanliness is not observed.

When the disease begins as a local affection, it commences as a vesicle, surrounded by dusky red inflammation, with severe darting and stinging pains. When the pustule is ruptured the ulcer displays a dirty, foul slough. The sore soon enlarges; the edges become everted, and the parts puffy and swollen; the surface is composed of gray or ash-colored sloughs, which may become brown, or resemble coagula of blood. These symptoms are accompanied by loss of sleep and exhausting diarrhœa, which, if continued, end in death in about three weeks.

Treatment. It is well to commence the treatment of the case with a free purge; a mercurial purge is to be preferred; calomel and jalap, or calomel with rhubarb, or compound extract of colocynth, will answer. During the course of the disease the bowels should be kept in a soluble condition.

When the patient begins to show evidence of flagging, tonics, in the shape of iron, quinine, together with wine, brandy, milk, nutritious broths, should be had recourse to. Tincture ferri chlor., in doses of twenty drops, every three or four hours, is probably the best preparation of iron. To allay pain and irritability, and produce sleep, opium should be given in large doses.

The diet should be highly nutritious, and if there is evidence of a scorbutic taint, oranges, lemon juice, potatoes, onions, tomatoes, etc., must be freely given.

The local treatment should be soothing; the exposed surface should be thoroughly cleansed and dried, and the parts freely bathed with a weak solution of acid nitrate of mercury, carbolic acid, nitric acid, sulphate of copper, etc., etc.

Great care must be taken, not only to keep the parts clean, but everything surrounding the patient should be kept clean, and changes in the dressing should be constantly made.

Bromine, permanganate of potassium, chloride of zinc, chlorinated sodium, creasote, nitrate of silver, etc., all have their advocates, and may be used in turn.

MORTIFICATION.

Mortification is the death of any part of the body, in consequence of disease or injury.

Symptoms. The symptoms are, the part becomes dusky, then livid, or blue or greenish; it loses its sensibility, and blisters form on the surface, containing bloody serum, which exudes; if gangrene proceed to mortification the part may become dirty brown and black; if moist, it will decompose, and will often swell and crepitate on pressure.

Traumatic mortification includes all the varieties of injury which kill parts outright, or injure them so that they cannot go through the processes necessary for repair, such as severe bruises, long continued pressure, wounds, torn or bruised, compound fractures, gunshot wounds, etc., *strangulations*, as in hernia, or when a portion of the bowel is twisted on its axis, or a bandage is applied too tightly.

Irritants cause mortification, when substances are incompatible with health and quiet of tissues, such as extremes of heat and cold, irritant poisons, caustics, etc.

Of all traumatic causes the most common are those which interfere with the main artery or vein of a limb. *Diseases of arteries*, atheroma, bony deposit and *embolism* are also causes.

The principle *constitutional* causes are debility, privation, exposure, unwholesome food, scurvy and other blood diseases.

The tissues most disposed to mortification are the areola, tendons and ligaments; bone, if deprived of its periosteum. Muscles, blood vessels and nerves resist it most.

When gangrene is spreading, the dark color is diffused and lost in the surrounding skin; but when its progress is arrested, a healthy circulation is established up to the margin of the mortified part, and the *line of demarkation* separates the living from the dead part.

The *constitutional symptoms* are those of depression; if it be very extensive, or if the mortified part be of great importance, the symptoms will be of a low typhoid cast; there will be anxiety, hiccough, a jaundiced skin, soft, rapid and jerking pulse, profuse perspiration.

Treatment. The strength must be maintained by good, nourishing diet, wines and tonics, brandy, whisky.

Opium is of great value, in doses sufficient to allay irritability.

With regard to amputation: if the mortification arise from constitutional causes, as from loss of blood or from fever, the surgeon should wait until the gangrene is arrested; but if the disease be local as to its cause, as in mortification from compound fracture, then amputation should be performed, without waiting for the line of separation; it would be proper to amputate just above the injured part.

ERYSIPELAS.

Erysipelas is a diffused inflammation affecting the skin and areolar tissue.

Symptoms. Cutaneous erysipelas is known by redness of the skin, which disappears momentarily on pressure; the swelling is puffy, with a distinct edge; the pain is smarting, burning and stinging. The redness is of a vivid, scarlet hue, with a tendency to become yellowish, if there be much debility. The nearest lymphatic glands are always swollen and tender.

In the *phlegmonous* erysipelas the redness is deeper; sometimes dusky and purple; the swelling is greater and is hard and tense; or it may be more doughy and pitting on pressure; the pain is not only burning but throbbing.

The disease begins with shivering, headache, pain in the back, nausea, vomiting, followed by fever, which is of a low type, especially if the patient be old and weak, or if it be of a hospital origin. Diarrhœa and perspiration may be present from the outset, particularly if the case be asthenic in character.

The cutaneous variety may terminate in resolution, with desquamation and slight œdema, or it may subside, leaving *bullæ* or vesicles remaining under the cuticle, which dry into scales and peel off, leaving a healthy cutis and sometimes superficial ulcerations.

It may terminate by the appearance of small abscesses.

Ordinary duration is from seven to fourteen days.

The phlegmonous erysipelas often leads to diffuse suppuration of the areolar tissue, when the swelling is flaccid and *quaggy;* patches of the skin become purple and slough; the intermuscular tissue and fasciæ may suffer in the same way, and even if the patient escape with his life, the limb may remain permanently useless.

Phlegmonous erysipelas is more dangerous than the cutaneous variety; the disease is particularly to be dreaded when it attacks the scalp. In old persons, the intemperate, and in the very young, the prognosis is very grave. An epidemic of this disease is always more destructive to life than when it occurs sporadically. Traumatic erysipelas is always a cause for grave concern.

The tendency to relapse after the disease has disappeared from the part originally affected is very remarkable.

Treatment. It is well to begin the treatment with a purgative, unless the patient be very weak and delicate; calomel, rhubarb and compound extract of colocynth are the articles to be mainly relied upon. When the bowels have been thoroughly evacuated, none but the most gentle aperients should be employed, as blue mass, Seidlitz powders, etc. If there is irritation of the stomach, or diarrhœa, small doses of hydrarg. c creta, with bismuth, may be used with advantage. If the cutaneous functions are more or less interrupted, diaphoretics are indicated; Dover's powder, with tepid sponging or warm bath, may be used. Anodynes, to allay pain and induce sleep, must be employed. When there is a tendency to prostration, stimulants and tonics must be early resorted to. The tincture of the chloride of iron, alone or with quinine, should be freely given.

The list of topical agents is large and varied.

Nitrate of silver in solution, say from twenty to thirty grains to the ounce of water, applied directly over the affected parts, or by a belt drawn around it, is a valuable remedy.

Tincture of iodine, diluted with an equal part of alcohol, may be used in the same manner. Muriated tincture of iron, a solution of acetate of lead and opium, chloride of ammonium, alcohol, chloride of sodium, carbonate of potassium and quinine, are all highly commended.

In the more simple varieties it is sometimes useful to dust the affected parts with starch, flour, arrow root, prepared chalk or carbonate of zinc.

CARBUNCLE OR ANTHRAX

Is a hard and circumscribed inflammatory spot of the true skin; varying in size, usually forming on the cheek, neck or back; infiltrated with unhealthy lymph, and is a dull red swelling, very tender to the touch and accompanied by a heavy, aching pain.

Carbuncle is generally preceded by pain, and is from the first a swelling of considerable hardness; the surface of the tumor then assumes a livid redness and a spongy feel; little ulcers now form on the skin, which give it a sieve-like appearance, so numerous are the orifices; from these a whitish discharge exudes. When the little openings are formed into one, the dead cellular membrane begins to escape.

Carbuncles are generally accompanied by great prostration, sickness, loathing of food, headache, and other symptoms of low febrile impression.

Treatment. It is well to begin the treatment with a calomel purge; after thorough purgation the treatment should be tonic and sustaining; the most suitable articles are quinine, iron, nourishing broths and brandy. To allay pain and procure sleep an opiate will be needed.

The best topical application is the warm water dressing, with acetate of lead and opium. Penciling the surface with tincture of iodine, and in some cases applying a blister over the infected part, are highly recommended. Professor S. D. Gross recommends, as a speedy and effectual method of relief, the introduction at four opposite points of a delicate tenotome; making a subcutaneous division of the wounded tissue in such a manner as to traverse the entire swelling.

When the disease has passed into gangrene, the remedy is a free incision, the knife being carried through the skin down to the healthy structures beneath. If the dead tissues are slow in coming away, their extrusion may be expedited with the scissors; the surface of the ulcer being well touched immediately afterward with dilute acid nitrate of mercury, or solid nitrate of silver, to promote the formation of healthy granulations. Use, several times a day, injections of solutions of chlorinated sodium, carbolic acid, permanganate of potassium, or common salt. When the sore begins to present a healthy appearance dress the parts with opiate cerate, or elemi ointment, or poultices of ground flaxseed.

BOIL, OR FURUNCLE.

A **Boil** is a hard, bounded, deep red, raised and very painful swelling, situated in the sebaceous follicles of the skin, occurring on all parts of the body, usually terminating in suppuration.

A slight pain first attacks some part of the skin, a little swelling appears, which becomes elevated, hard, and of a deep red color, when the pain increases. The swelling becomes white at the top, it breaks, some pus mixed with blood is discharged, and then the destroyed cellular tissue, called the *core*, is discharged, when the surrounding hardness subsides.

Treatment. The usual treatment is to poultice the part and make a free incision to let out the contents. For indolent boils a good application consists of glycerine and extract of opium, each a drachm, resin cerate, an ounce; it relieves the pain and irritation. Painting the part with tincture of iodine, or solution of nitrate of silver, are both recommended. Should the patient's condition require them, tonics should be employed, and when there is a tendency to recurrence Fowler's solution, in doses of two or three drops, thrice daily, will be found efficacious.

According to Dr. Ringer, the sulphides possess the power of checking the formation of pus. Calcium sulphide, given in doses of a tenth of a grain hourly, is recommended where there is a succession of boils.

GONORRHŒA.

Gonorrhœa is a contagious purulent inflammation of the mucous membrane of the genitals of both sexes.

The time at which the disease usually appears after contagion, is from the fourth to the fifth day; the later it appears the less severe it generally is.

The patient first experiences a sense of titillation in the urethra, as if a drop of urine were contained in it. Upon examination, he finds that the lips of the urethra are red, and that there is a slight mucous discharge. Soon the urethra begins to be affected with considerable heat, and pain is experienced in voiding the urine, which is called *ardor urinæ*. The pain in many cases becomes excessively severe; there is an appearance of threads mixed with the urine. The next effect is a considerable diminution in the stream of urine, the swollen state of the urethra contracting the size of the canal; it is often discharged in two or more streams, becomes forked, in consequence of the irregular and contracted state of the urethra, and is passed with much straining, pain and scalding. At first the discharge is mucous, but after a little time it assumes a purulent appearance. The matter becomes yellow, and in some cases green, and it is frequently mixed with blood, so as to give the discharge a sanious appearance.

The disease does not confine itself to the beginning of the urethra, but extends along the course of the canal, and often produces inflammation of the glans and frænum, occasioning effusion into the prepuce and phimosis. The absorbent vessels on the dorsum penis often become enlarged and hard, and produce little abscesses, which go on to suppuration.

In a first gonorrhœa the glands of the groin are often sympathetically affected, and become enlarged and painful.

Irritation and inflammation also take place in the corpus spongiosum, producing the painful state known as *chordee*. The penis is sometimes curved, and sometimes turned considerably to one side, and the groins, thighs, perineum and testicles ache and feel tender.

After the inflammatory stage abates, a muco-purulent discharge remains, which, when obstinate and thin, is called *gleet*.

In the inflammatory stage of the disease there is often *irritation* or *actual inflammation of the urinary organs*, causing the most exquisite agony, or complete retention of urine. This inflammation may reach the bladder, giving the patient a desire to frequently pass water, and causing great pain in doing so.

There may be *hemorrhage* from the urethra; inflammation of the lymphatic glands of the groin, constituting bubo; *balanitis*, or suppurating inflammation covering the glans penis; phimosis, paraphimosis, or inflammation of the testicle in men, or the ovary in women.

Treatment. The treatment should begin with the free use of a mild sedative injection into the urethra. The bowels should be opened by some saline aperient. Abstinence from all alcoholic liquors should be enjoined; the diet should be very plain, and sleep should be procured by Dover's powder, or other anodynes. The sulpho-carbolate of zinc lotion, applied several times a day, is highly recommended by Mr. Wood.

If the patient is strong and plethoric, and suffers greatly from pain and fever, with pain in micturition, it is well to apply two or three leeches to the perineum.

After the acute symptoms have subsided, the remedies of the best reputation are copaiba and cubebs. It is best to give the copaiba in small doses, and the cubebs in larger doses; the oil of sandal wood also has a high reputation.

The most usual mode of administering copaiba is in the form of emulsion, prepared by rubbing the balsam up with gum acacia, and adding camphor water and spirit of nitrous ether, to which a little tincture of opium may be added; great benefit is frequently to be derived from combining the copaiba and cubebs in the same emulsion. Painful erections and chordee may be relieved by a bag of cold water applied to the part; or, a little mercurial ointment and extract of belladonna may be smeared on the part at bedtime. Hemorrhage may be checked by cold water and ice pressure on the urethra at bedtime.

STRICTURE.

Permanent **stricture** is caused by contraction of the urethra, usually from inflammation, infiltration of plastic effusion, and subsequent shrinking of this material and of the canal, with fibroid degeneration of the tissues around.

In some cases a small portion of the mucous membrane is found thickened and deprived of its natural elasticity, but in old neglected cases the canal, with the *corpus spongiosum* around, will be converted into a thick, gristly mass, several inches in extent.

The most frequent *situation* of the stricture is in the neighborhood of the triangular ligament.

The causes of stricture are repeated attacks of gonorrhœa, intemperance, and unhealthy condition of the urine.

Symptoms. The patient finds that he wants to make water oftener than usual, with an uneasy sensation in the perineum after doing so; a few drops remain in the urethra and dribble from him after he has buttoned up.

Next he finds that the stream is smaller than hitherto, that it is forked or twisted, and that he requires a long time to pass his urine.

Pretty soon the bladder becomes irritable, so that the patient is forced to rise in the night to void his urine, and is liable to attacks of spasm, with complete retention.

If the complaint continues, the health suffers, the bladder, ureters and kidneys become diseased. The patient suffers from general debility and nervous prostration, and the urine is loaded with fetid mucus. Going from bad to worse, the patient will finally succumb to irritative fever or uræmic poisoning.

Treatment. When the case is taken in hand early, the general health should receive prompt attention, and any disorder of the stomach, inflammatory tendency, or irritating condition of the urine should be treated.

Warm baths, opiate suppositories, belladonna smeared on the perineum, and alkalies, may be of service.

The *mechanical* means to be resorted to are—

Slow dilatation by simple bougie; dilatation by means of expanding instruments; the retained catheter; the caustic bougie; incision within; division from the perineum.

The gum-elastic bougie and the metallic bougies are too well known to need description here. For a detailed account of these instruments, as well as of the dilators, the student is referred to the standard works on surgery.

HEMORRHAGE FROM THE URETHRA.

Hemorrhage from the urethra may be caused by the introduction of bougies, by a false passage, from internal injuries, by the separation of a slough formed by the caustic bougie, or by the rupture of a blood vessel during acute chordee.

It may occur from general arterial excitement.

The recumbent posture, application of cold and pressure, should be tried. A flat piece of cork should be pressed by the patient against the perineum, far back, and gradually moved forward till it lights on the right spot, and the dripping of blood will cease. A solution of tannin in acid water may be used as an injection. Gallic acid may be of service.

RETENTION OF URINE.

Retention of urine is an inability, whether partial or total, of expelling by the natural efforts the urine contained in the bladder.

The characteristic symptom of this complaint is a distention of the bladder, to be perceived by an examination of the hypogastrium, after the patient has discharged all the urine that he is capable of expelling.

The most frequent causes are strictures of the urethra, an enlargement of the prostate gland, and retroversion of the uterus in the female; there are other causes, such as stones in the urethra, accumulation of blood in the bladder, etc.

Treatment. The indication is to procure a discharge of urine as speedily as possible; this is to be sometimes done by means of fomentations, the warm bath, opium, and sometimes by the removal of mechanical obstacles to the flow of urine, but the catheter is to be early resorted to; if for any reason the catheter cannot be introduced, then the bladder should be punctured.

The operation of puncturing the bladder may be effected above the pubes, through the rectum or through the perineum.

In passing the catheter, the patient lies on his back, near the edge of the bed, the head being supported on a pillow, and the knees slightly separated from each other, somewhat raised. The surgeon, standing at the left side of the bed, takes the penis in the left hand and raises it to a right angle with the body, to efface the curve which it forms at the pubes. The catheter, held in the right hand, between the thumb and first two fingers, is inserted into the orifice of the urethra, its concavity being directed toward the abdomen, with the handle nearly in contact with the middle line. The instrument is now passed on, until it reaches the sinus of the bulb, which lies on the anterior surface of the triangular ligament, rather deep in the perineum. To disengage it from the sinus the handle is changed from the horizontal direction into the vertical, at the same time that the point is slightly retracted. By this manœuvre the curved portion is brought under the arch of the pubes, and immediately opposite the opening of the triangular ligament. By now depressing the handle of the instrument, so as to bring it into a straight line, the point readily glides over the prostatic part of the urethra into the bladder.

CHANCROID.

Soft chancre, or *non-infecting sore.*

This is a highly contagious suppurating ulcer, capable of being inoculated on the same patient, but it is a local disease, and produces an ulcer wherever inoculated; unless infected by syphilis, there are no secondary symptoms.

This is the most common form of venereal ulcer, and is rarely met with except on the organs of generation.

Symptoms. During the first twenty-four hours the point reddens; on the second or third day it swells slightly and becomes a pimple, surrounded by a red areola; from the fourth to the fifth day the secretion increases and becomes purulent, and the vesicle becomes a pustule with a depressed summit. After the sixth day an ulcer appears; its depth is equal to the thickness of the skin, its edges seeming as though cut with a punch; its surface covered with a grayish, pultaceous matter. The discharge is purulent; the sore is painful and is not hard. It lasts from three weeks to three months, and is attended with a bubo, which tends to suppuration.

Diagnosis. The affections with which chancroid are most liable to be confounded are chancre, herpes, eczema and balanitis.

Chancroid may be distinguished from chancre by its rapid development, its increased secretion, absence of induration, and its tendency to multiplicity.

From *herpes* chancroid may be known by the former usually presenting itself on the head of the penis and prepuce in little vesicles, about the size of the head of a pin, occurring in groups, set closely together, of a whitish color, and resting on a florid base.

In *eczema* the little vesicles are more minute and diffused than in herpes, and there is generally greater local irritation, the parts being swollen, hot, red and itchy.

In *balanitis* the inflammation is usually widely diffused, the discharge being profuse and of a thick, muco-purulent nature ; there is no circumscribed ulceration, as in chancroid.

Simple ulcers, abrasions or excoriations may appear on the prepuce and glans, and care must be taken not to confound them with chancroid.

Treatment. In the treatment of chancroid Professor S. D. Gross gives the preference to the application of the officinal solution of the acid nitrate of mercury, applied either pure or diluted, according to the exigencies of the case; an average strength is one part of the acid to two parts water, applied with a piece of soft wood; the ulcer being first dried with a bit of cotton, and immediately after bathed in pure water; or, instead of the mercury, concentrated nitric acid may be used, so as to destroy the surface, the excess being carefully wiped off. After this an emollient poultice may be applied.

When the acid nitrate of mercury or nitric acid is not used, carbolic or hydrochloric acid may be employed; Vienna paste is highly recommended. Ricord prefers a caustic composed of sulphuric acid and powdered charcoal, united in proportions to form a semi-solid; of this mixture apply a thin layer to the chancroid and the adjacent parts; allow it to dry, when it will form a black, adherent crust, which, on dropping off, leaves a healthy sore, followed by rapid cicatrization.

The parts should be frequently bathed in warm water, containing a small quantity of acetate of lead or common salt.

The ulcer must be kept covered with lint, wet with a weak solution of tannic acid and opium, a weak preparation of yellow wash (bichloride of mercury, gr. ⅛, to lime water, ℥j), sulphate of copper (gr. j to water, ℥j) or black wash. Many surgeons apply a powder composed of calomel and subnitrate of bismuth, each one part, and carbonate of zinc, two parts; first carefully washing the parts, and afterward keeping them wrapped in a solution of lead water and laudanum.

When the parts begin to granulate it is best to apply the simplest dressings, such as opiate cerate, or ointment of red oxide of mercury, largely diluted with cosmoline.

The diet must be carefully watched; animal food and stimulants avoided, the nourishment being plain and simple; cooling purgatives administered from time to time.

Pain and morbid erections are relieved by opiates, bromide of potassium or chloral, together with soothing applications to the parts.

Serpiginous sores are those that wander over the surface of the thighs and abdomen, healing in one direction and spreading in another; one of the most efficient local remedies for this condition is saturated solution of potassio-tartrate of iron, applied on lint; or it may be necessary to use solutions of nitric, carbolic or hydrochloric acid.

Opium should be given to allay pain. Quinine, mineral acids, iron, cod-liver oil, a liberal diet, exercise in the open air, and change of scene, are the indications to aid recovery.

BUBO.

A bubo is an inflammation of a lymphatic vessel or gland, from any cause, but it is commonly restricted to the inflammation of the inguinal glands which accompanies a venereal sore or gonorrhœa.

A chancroidal bubo is an enlargement of the lymphatic glands of the groin, and is the result of the transference of the virus of the original sore to the groin; it may arise during the existence of a chancroid, from the absorption of its poison, and is likely to suppurate quickly.

Inflammation of the glands of the groin is a common occurrence, either after the local application of a poison capable of being absorbed, or after inflammation of the skin or mucous membrane, or without any special local cause, during a period of constitutional cachexia.

The chancroidal bubo is usually limited to one or, at most, two glands. Bubo depending on true chancre is likely to be multiple and indolent.

The bubo usually occurs on the same side as the primary sore; when the chancroid is situated near the mesial line a bubo may be developed in each groin.

Acute bubo pursues the course of acute abscess, with its attendant symptoms, shivering, pain, tenderness, swelling; the skin becomes red and thin, then matter points and is discharged; when the disease assumes this form, it usually runs its course rapidly, and is accompanied by severe constitutional disturbance. When the contents of the abscess are discharged, it is then called an open or *ulcerating* bubo, and the opening will be in the neighborhood of Poupart's ligament, either above or below, or partly above and partly below.

Indolent bubo occurs in persons of a weak and scrofulous constitution; after having made a certain amount of progress, it may remain stationary for some time, neither advancing nor receding.

Treatment. If the case is seen early, before there is much inflammatory action, or before suppuration is commenced, an attempt should be made to abort the disease by means of rest, aperients, fomentations, soothing applications or a few leeches. If these remedies do not answer, recourse should be had to pressure, either with a truss, a piece of lead, a series of pads,.or layers of wet sponge, frequently renewed and secured with a spica bandage. Tincture of iodine freely applied should be tried before pressure is resorted to. If the disease has already made some progress, an eschar should be formed upon the most prominent portion by means of the Vienna paste, applied as in making an issue.

When the skin becomes thin and shining, and suppuration is threatened, it should be expedited by emollient poultices, and as soon as fluctuation is observed a free incision should be made and the matter thoroughly evacuated; after a day or so, lint dipped in a solution of nitrate of silver, or sulphate of copper, or of nitrate of mercury, should be pressed into the bottom of the wound. If the constitution is impaired, the usual tonics, such as cod-liver oil, iron, etc., must be given, and change of air recommended.

SYPHILIS.

Definitions. "Syphilis is an infectious, contagious and inoculable disease, of slow evolution; it first manifests itself by an indurated or infecting chancre, afterward by eruptions of the skin and mucous membranes, later by chronic inflammations of the cellulo-vascular tissue and bones, and finally by special productions in the form of small tumors or nodules, which have received the name of gummata."—*V. Cornil.*

"The term syphilis is applied to a disease which, commencing in the genital organs, in the form of a sore of a specific character, invades the lymphatic glands of the groin, the cutaneous and mucous tissues, and finally also the bones, cartilages, fibrous membranes and viscera, leaving upon each and all of them, as well as upon the system at large, a peculiar and distinctive impress."—*Gross' System of Surgery.*

CHANCRE.

The parts most frequently involved in the male are the head and prepuce of the penis, and in the female the labia and nymphæ, the entrance of the vagina, meatus and fourchette.

The period of incubation may be stated at from ten days to fourteen weeks; the average period is from eleven to twenty-one days.

After the period of incubation has elapsed, if on the mucous membrane, the sore is generally of a rounded or oval shape; the base slightly depressed, seldom excavated, smooth, and of a reddish, livid grayish color; on the skin, it may begin with a raised pimple, with some exfoliation of cuticle, or a mere excoriation or fissure, or a shallow, smooth ulcer, not perforating the whole thickness of the skin; it is more depressed than when situated on the mucous membrane.

The distinctive sign is an abruptly circumscribed induration, like that of cartilage; ulceration, inflammation or suppuration may accompany the induration.

The edges of the sore will be sloping, flat and adherent. The discharge, if any, is not copious or purulent, but scanty.

The ulcer is most generally single in chancre, whilst in chancroid the sores are multiple.

The induration is the most characteristic sign of the disease; it generally begins to be observable between the eighth and tenth day after exposure.

Chancre seldom occurs more than once in the same individual.

Treatment. If an individual present himself within a few hours after impure connection, with an abrasion or sore on the penis, the safest plan is to excise the part; if this is not considered feasible, it will be well to cautiously apply to the part the acid nitrate of mercury, nitric acid or Vienna paste. After using any of the foregoing agents, the local treatment should be strictly soothing and antiphlogistic; perfect rest being enjoined. Local baths, either simple or medicated, are highly recommended; after bathing, the best local application is a moderately strong solution of acetate of lead, combined, or not, with opium, applied on soft lint or cotton wool, and covered with oiled silk. An elm poultice may be substituted.

The most reliable internal remedy is mercury in some form; calomel in doses of gr. $\frac{1}{3}$ to gr. $\frac{1}{2}$, given three times daily, before meals; if the patient be plethoric, a few drops of aconite may be added; the case must be vigilantly watched and ptyalism carefully avoided.

This treatment must be kept up for the period of six weeks at least. Blue mass or protiodide of mercury may be substituted for calomel.

To *eliminate* or *destroy the syphilitic virus* it will be necessary to persist in the use of mercury for the space of two years, at least. Protiodide of mercury, in doses of gr. $\frac{1}{4}$, three times daily, is the remedy generally preferred.

As an eliminator of the poison of syphilis in its incubative stage, tartar emetic, in doses of gr. $\frac{1}{12}$ to gr. $\frac{1}{8}$, three times daily, given, if necessary, in conjunction with aconite or sulphate of magnesia, is highly recommended.

SECONDARY SYPHILIS.

Secondary syphilis is that group of morbid phenomena which present themselves from six to seven weeks after the occurrence of an attack of primary syphilis.

Secondary syphilis is always preceded by chancre, and it may come on before the initial lesion has disappeared.

It is usually ushered in by well-marked constitutional phenomena; the patient feels uncomfortable and unwell; is irritable and desponding; countenance has a dull, muddy aspect; limbs and joints are sore and stiff; his appetite is impaired; his urine is scanty and high colored; is easily fatigued; has headache and disturbed sleep.

After a few days he is seized with rigors, followed by high fever, or by fever and profuse sweats.

The attack is called syphilitic fever, and is an effort of the system to eliminate the poison.

The skin and mucous membrane, with the posterior cervical glands, are the parts most liable to attack.

Affections of the skin. Of these there are six varieties, viz.: the exanthematous, scaly, vesicular, papular, pustular and tubercular.

Syphilitic eruptions are generally chronic; in form more or less circular, and usually copper colored; after having existed for some time they become of a grayish muddy, or bronze, appearance; usually appearing on the forehead, nose, cheek, back and shoulder; they are accompanied or followed by grayish, hard and thick scales, greenish scabs, narrow cracks, or well-defined ulcers.

In the *exanthematous* form the spots are pinkish, reddish, or of a pale copper color; they are most prominent on the trunk and extremities, and usually pass off with a slight desquamation of the cuticle. This eruption will make its appearance between the sixth and twelfth week after the appearance of the initial lesion.

As the eruption fades it loses its reddish tint, and assumes a dingy, dusky aspect. Duration from ten days to six weeks.

The *scaly variety*, or *psoriasis*, comes on from two to six months after the primary disease; it is always chronic, and is often associated with ulceration of the throat and palate, iritis, affections of the bones and joints.

The disease presents itself in thick scales of a dull grayish appearance. It may occur on any part of the body, but is most commonly met with on the forehead, scalp, face, forearms, palms of the hands and soles of the feet.

The *vesicular variety* is very uncommon; it usually begins with minute, circumscribed pimples, scattered over the body, which are succeeded by a transparent, serous fluid, surrounded by a reddish, copper-colored areola. They are most common on the neck, chest and extremities.

The *pustular variety* are circumscribed elevations of the skin, occupied by pus, and readily tending to ulceration. They range in size from a pea to an ordinary marble. They exist in great numbers; each pustule rests upon a hard, copper-colored base.

After a time the contents of the pustule escape, concrete, and form hard, thick scabs, of a dark brownish color, firmly adherent.

The *papular* syphilis or *lichen* is distinguished by the appearance of small, hard, solid elevations, and containing no fluid, and generally terminating in desquamation, seldom in ulceration. This affection may be acute and primary, or chronic and secondary.

The *tubercular* form of syphilis exists in two varieties; in the first the eruption consists of small, red, copper-colored eminences, varying in size from a small bird shot to that of a pea; they are smooth and polished, and soon become covered with a dry, scaly crust.

In the more aggravated form the tubercles are larger, of a deep violet color; after continuing for a longer or shorter period they inflame, suppurate, and are replaced by deep, foul, painful ulcers.

Loss of hair from the scalp, eyebrows and lids is common as an early symptom. When the system is saturated with the virus, the beard and the hair of the rest of the body may also disappear.

Affections of the mucous membranes are liable to appear within four or five weeks after the initial lesion.

The parts usually affected are the tonsils, palate, pharynx, tongue, cheek and lips. Well-marked signs of the disease frequently appear at the anus and lower part of the rectum, upon the foreskin and head of the penis of the male, and upon the vulva, vagina and uterus of the female.

Secondary affections of the mucous tissue occur in various forms, as an erythematous disease, as a tubercle or as an ulcer. Syphilitic *erythema* occurs most frequently in the throat, affecting the arches of the palate, uvula, pharynx, and sometimes the root of the tongue.

The inflammation is either diffused, or it occurs in distinct mucous patches of a circular or oval form; it is of a copper color.

Ulcers of the throat generally make their appearance on the uvula and tonsils, arches of the palate and back of the pharynx.

The superficial ulcer is either simply an erosion, or a cavity with well-defined, ragged edges, rather sharp and somewhat undermined. It usually presents itself early after the primary sore.

In the excavated ulcer the edges are steep, everted, or ragged, and are surrounded by a hard, inflammatory, copper-colored base; the discharge is thin and ichorous; the sore is most distinctly marked on the tonsils. They are liable to take on phagadenic and gangrenous action, and extensive destruction of the soft palate frequently results. The excavated form of the disease is usually accompanied by extensive swelling, together with great pain and difficulty in swallowing. Mucous *tubercles* generally occur upon the tongue, lips, inside of the cheek, tonsils and palate; they are slight elevations of the mucous surface, usually of an irregular oval or elongated shape, and of a whitish hue.

Treatment. Should the condition of the patient require it, and should the individual be plethoric, antiphlogistics should be resorted to. The bowels having been opened by a brisk cathartic, saline and antimonial preparations are to be employed; especially if syphilitic fever be present.

When these remedies fail, recourse must be had to mercury; the preference is given to calomel, in doses of gr. ¼ to gr. ½, three times daily, guarded with opium; a favorite remedy is the protiodide of mercury, in gr. ¼ doses, three or four times a day. Corrosive sublimate, in one-twelfth grain doses, is a remedy much in use. If blue pill is preferred, it should be given night and morning, in doses of five grains. If friction be resorted to it is best to use the blue ointment.

Frequent ablutions must be insisted on. Various lotions are of service, as yellow wash, solutions of nitrate of silver, sulphate of copper and glycerine.

When the patient is threatened with loss of hair he should be promptly treated; the hair should be cut short and mild lotions of alcohol and aqua ammonia should be applied, or alcohol, glycerine and tincture of cantharides may be used, or a wash composed of tannic acid, gr. vj, sulphate of copper, gr. ½, bay rum and water, each an ounce; or tincture of cantharides, two drachms, aromatic spirit of ammonia, half an ounce, rose water, four ounces, and corrosive sublimate, four grains.

The most suitable local remedies to the mucous surfaces are nitrate of silver in substance, or acid nitrate of mercury variously diluted. When the part is ulcerated the preference is given to the acid nitrate of mercury, diluted with eight or ten parts of water.

Nitric acid, carbolic acid, or hydrochloric acid properly diluted, may be used as substitutes for the acid nitrate of mercury.

Gargles composed of pyroligneous acid, ʒ ij, water, ℥ viij, honey, a sufficient quantity; or subacetate of copper and tannic acid; or tannic acid and glycerine; or nitric acid and chlorinated sodium, may all be advantageously used in turn.

TERTIARY SYPHILIS.

By the term tertiary syphilis is generally understood those symptoms of the disease that show themselves after six months from the commencement of the primary sore; the average period ranging from six to eighteen months.

The textures most prone to suffer in tertiary syphilis are the connective tissues, mucous membranes, periosteum, bones, fibro-cartilages, aponeuroses, tendons and testicles.

The most common of the internal lesions are gummy tumors, foul, ragged-looking abscesses, softening and pulpy degeneration, and tubercular deposits

Iritis occurs in the advanced stages of syphilis; the disease usually affects both organs, and extends rapidly to the cornea, choroid and retina; few persons recover without loss of sight.

The *eyelids* are frequently attacked with the disease; it generally shows itself as an indurated ulcer of an oval shape; the borders are inflamed and thickened, and the conjunctiva is usually inflamed.

Affections of the periosteum and bones present themselves in the form of nodes or gummy tumors, inflammatory hypertrophy, exostosis, caries and necrosis. These affections may come on any time after eighteen months from the first affection. They are most liable to occur in persons of a scrofulous habit, or whose constitutions have become impaired from any cause.

The bones affected by tertiary syphilis are those that are superficial, or least protected by the soft parts, as the tibia, fibula, ulna, clavicle, and bones of the skull, nose, palate and upper jaw.

Nodes occur, usually, upon the tibia, ulna, clavicle, frontal and parietal bones.

They are usually circumscribed, semi-solid swellings, of an ovoidal shape, and of a slightly elastic touch.

The periosteum and bone are inflamed, softened and ulcerated, and as the tumor extends, the structures over the seat of the disease become red and painful, and ulceration finally takes place at the most prominent point.

The course of the disease is chronic, and it is attended with an intermittent, neuralgic pain, greatly increased at night.

Caries is most common in the long bones of the extremities, in the skull, and in the palate, maxillary, nasal, turbinated ethmoid bones and vomer.

Hypertrophy of the osseous tissue is exceedingly common, and may involve many of the bones; those most liable to be attacked are the tibia, fibula, femur, ulna, radius and cranium. The tumor is usually knotty and irregular, with a broad base and a rough, scabrous surface; in long standing cases it becomes hard, and of the consistence of ivory.

Treatment. Iodide of potassium, given in solution, is the remedy most frequently resorted to in tertiary syphilis; fifteen grains, three times a day, is a medium dose, but it is frequently given in much larger quantities; it should be taken about an hour after eating.

Iodide of potassium is frequently combined with carbonate or muriate of ammonium, or iodide of sodium, or iodide of ammonium; the average doses of these remedies is about eight grains; their efficacy will be enhanced by the addition of a small quantity of mercury; the form of mercury usually preferred is the bichloride, in doses of $\frac{1}{16}$ to $\frac{1}{8}$ of a grain, three times daily. A good substitute for the bichloride, should it disagree with the patient, will be found in the biniodide.

Donovan's solution is a remedy in general use, the dose being from 5 to 8 drops. Tonics are generally indicated; quinine and iron are usually preferred.

Sudorifics are highly praised when there is obstructed perspiration; Dover's powder, antimony, morphia, warm or steam bath, are the remedies generally preferred.

Anodynes are most valuable auxiliaries, it being of vital importance to produce sleep and to quiet the nervous system; morphia, laudanum, black drop or opium must be used in sufficiently large quantities to answer the indications.

For ulcers, fissures, eruptions, etc., the topical treatment generally in use are weak solutions of nitrate of silver or acid nitrate of mercury; when there is much inflammation present, acetate of lead and opium may be employed.

Syphilitic *onychia* is best treated by the application of nitrate of lead, sprinkled over the sore three or four times daily.

Tertiary ulcers of the throat, mouth and *tongue* are most beneficially treated with applications of acid nitrate of mercury or solid nitrate of silver. Weak gargles or washes of acetic acid, tannic acid and sulphate of copper, or chlorinated sodium, may be employed in the intervals.

For *syphilis of the nose,* injections of weak lotions of iodide of iron, sulphate of copper and tannic acid, tincture of myrrh, permanganate of potassium and chloride of zinc are most to be relied upon.

The remedy for syphilitic *iritis* is mercury pushed to rapid ptyalism.

For ulcers of the *eyelids*, use iodide of potassium, and apply dilute ointment of nitrate of mercury.

The pain and swelling of the *bones* are frequently benefited by applying tincture of iodine, leeches and blisters. Freely incise the node if there be fluctuation; but if it be very small and free from serious annoyance, let it alone. If the ulcer is slow to heal, apply a blister and dress it with mercurial ointment.

WOUNDS.

A Wound is a solution of continuity, or separation of continuous parts, suddenly occasioned by external violence and generally attended with hemorrhage.

Wounds are distinguished into several kinds :—

INCISED WOUNDS.

An **Incised wound** is a division of the parts, more or less extensive, according to the extent of the injury.

The fibres have only been simply divided; there is no contusion or laceration; hence they are not likely to take on severe inflammation, nor are they apt to slough or suppurate.

Upon the extent and color of the hemorrhage the surgeon is enabled to judge of the kind of vessel injured; if an artery is wounded, the blood flows rapidly in jets and is of a florid color; if a vein, the bleeding is slow and the blood is of a purple color.

In a recent incised wound the indications are to check the bleeding, remove all extraneous matter, and to bring the parts in perfect apposition.

To check the hemorrhage, steady and continued pressure upon the surface, with a sponge wet with hot water, will be sufficient, as a general rule. Should the hemorrhage proceed from a vessel of some size, a ligature should be applied.

So soon as the bleeding ceases, all clots are to be completely sponged away and all foreign bodies must be carefully removed; the edges are then to be brought together in their entire extent, retained in contact by adhesive strips, or, if necessary, by the means of sutures. The wound being dressed, the parts must be placed at rest, in a relaxed position; if the biceps be divided, the limbs must be bent at right angles; if the triceps be injured, extension will be necessary.

LACERATED WOUNDS.

Lacerated wounds are those in which the fibres, instead of being divided by a cutting instrument, have been torn asunder by violence.

The edges of the wound are ragged and irregular; there is little pain or hemorrhage, and the surrounding parts, frequently bruised and discolored, are cold and numb.

A lacerated wound differs from an incised one, in the slightness of the pain and hemorrhage; in its tendency to suppurate and slough, and in its liability to be followed by erysipelas, septicæmia, pyæmia, tetanus and other nervous symptoms.

When the lesion is very extensive, the attendant shock being necessarily severe, local sensation is obliterated, but when reaction takes place the pain is frequently intense.

The treatment of lacerated wounds does not greatly differ from that of incised wounds. All foreign bodies must be removed, the vessels tied, the parts gently approximated. Great care must be taken to select a sound portion of the artery when the ligature is applied. Venous hemorrhage may generally be controlled by a compress and roller. All tension is to be carefully avoided, and large spaces left between the adhesive strips, for easy drainage.

To moderate the inflammation water dressing is to be used, either warm or cold. When suppuration presents itself, emollient poultices may be used, and when the granulating process is established, opiate cerate or dilute ointment of nitrate of mercury should be employed. Should the inflammation run high and gangrene be threatened, purgatives and nauseants should be freely used.

Anodynes, to allay pain and produce sleep, must be freely given. Secondary hemorrhage may arise as soon as reaction takes place, or it may occur when the sloughs begin to separate; this will likely take place in five or six days from the date of the injury and should be carefully guarded against, especially if a large artery is involved.

Should tetanus set in it should be promptly treated with anodynes, using opium, bromide of sodium and chloral freely.

CONTUSED WOUNDS.

Contused wounds are usually produced by greater violence than the preceding, and are accompanied with greater disorganization; blood is extravasated, cellular tissue is broken down, muscles bruised, and the surrounding parts apt to be disorganized.

They bleed but little, in consequence of the organization of the parts being destroyed. The pain which accompanies a wound of this kind is in inverse ratio to the amount of the injury. When there is a moderate contusion the pain is generally severe, and when there is a violent degree of contusion the patient scarcely suffers any pain until reaction sets in.

Treatment. If there is hemorrhage, it is to be controlled in the usual manner, by compression, hot water or styptics. The edges of the wound must be brought together gently, allowance being made for swelling and drainage. If it be necessary to use sutures to bring the parts together, it is proper to do so.

The parts are then to be kept wet with evaporating lotions, the best being alcohol largely diluted with water. When the inflammation is very active leeches may be necessary.

Pain and nervous symptoms are controlled by anodynes and antispasmodics.

After the lapse of a few days the part may be bathed with tincture of camphor, soap liniment, or dilute tincture of iodine.

PUNCTURED WOUNDS.

A Punctured wound is one made with a narrow-pointed instrument, such as needles, nails, splinters, swords, bayonets, scissors, hooks, etc.

These wounds are much more dangerous than cuts or incised wounds, from the effects they produce on the injured part.

A slight punctured wound through the skin into the cellular tissue will sometimes be followed by red lines along the course of the absorbent vessels, from the wounds to the absorbent glands.

If a tendinous structure be punctured, alarming symptoms will frequently follow.

In punctured wounds their depth is usually much greater than their width, making it frequently difficult to determine the amount of injury done to the parts.

The pain is often very great, depending upon the injury sustained by the nerves of the part; they are rarely attended with much hemorrhage, and sometimes hardly any.

They are very liable to be followed by erysipelas, angeioleucitis, abscess, contraction of the bowels, and wasting of the muscles.

The treatment consists in the extraction of foreign substance, if there be any, in checking hemorrhage, in moderating inflammation, and preventing the development of nervous symptoms.

All such articles as fish hooks and similar barbed substances must be extracted by counter openings, or pushing them through the part in which they may be imbedded.

If bleeding arises by reason of an artery having been laid open, it must be exposed and tied at both ends. A full anodyne should be administered, and the parts be wrapped in cloths wet with warm water and laudanum.

GUNSHOT WOUNDS.

Gunshot wounds are injuries caused by substances discharged from firearms, by fragments of stone or wood struck thereby, and by the bursting of firearms and shells.

The symptoms are local and general, and vary in character according to the extent of the lesion, the importance of the tissues involved and the idiosyncrasy of the individual.

The pain is often insignificant, and a person severely hurt may not be conscious of having received a wound until some time after it has been inflicted. The pain is of a dull and heavy character, unless a nerve is struck, when it will be sharp and severe, and burning or pricking.

The suffering is generally great when a bone is broken, a large joint penetrated, or a visceral cavity opened.

Owing to the contused and lacerated nature of the lesion, hemorrhage in gunshot wounds is not in proportion to the severity of the injury, unless an artery be laid open; the hemorrhage is generally external, the blood issuing from both orifices of the wound.

In wounds of the chest, abdomen and pelvis, the hemorrhage is usually internal.

Gunshot wounds are exceedingly liable to secondary hemorrhage. When secondary hemorrhage sets in, as the result of sloughing, it usually arises between the tenth to the fifteenth day.

The shock in these injuries is generally most intense when the ball traverses the head, chest, abdomen or pelvis.

Treatment. The indications are to promote reaction, arrest hemorrhage, ascertain the condition of surrounding parts, extract all foreign bodies, remove loose pieces of bone, if any, and endeavor to control resulting inflammation.

Reaction is brought about by employing the ordinary restoratives; the patient must be placed in the horizontal posture; cold water dashed in his face; he must be made to inhale ammonia water. If necessary, sinapisms must be employed, as well as stimulating injections used, and if he is able to swallow, brandy should be given him, or wine, or ammonia ly diluted.

If the hemorrhage be capillary, it will probably soon cease; if not, cold water, pounded ice, or some mild astringent lotion should be used; if, however, the hemorrhage proceed from an artery, the ligature must be promptly resorted to.

In ascertaining the condition of the wound care must be taken to ascertain if there are any foreign substances present, and whether any neighboring bone is injured.

The next point is to hunt for, and, if possible, extract the ball.

To control resulting inflammation great care is necessary to properly dress the wounded part, by gently applying a roller, if necessary, put on in such a manner as not to impede drainage.

After being dressed, cold or warm applications of water, depending on the season, are indicated; the water dressings may be medicated with opium or acetate of lead.

DISSECTION WOUNDS.

Dissection wounds are those contracted in the examination of dead human bodies.

Symptoms. The disease commences at the inoculated part, from whence it spreads.

The first symptom that attracts attention is a stinging or burning sensation; upon examining the part a little whitish vesicle is observed, extremely sensitive on pressure. When the vesicle breaks a small ulcer is exposed. The pain by this time is very great, the sore enlarges, the swelling increases, and the part feels hot, tense and numb. A red line is usually seen extending from the point of inoculation, along the arm, to the axilla. As the disease spreads the whole limb becomes enormously enlarged, pitting on pressure, and looking dusky and erysipelatous.

Cases occur where the symptoms begin at the axilla and extend from thence up the neck and down the side.

In the worst forms the disease soon reaches a crisis; the system rapidly falling into a typhoid state.

Treatment. As soon as a wound of this kind is received the part should be thoroughly washed with warm water and soap; this should be followed by suction by the mouth. If the wound is small it should be dilated; if it has bled, thoroughly cauterize with acid nitrate of mercury, or nitrate of silver, hydrochloric, nitric or sulphuric acid.

If a vesicle forms it should be freely opened, and then thoroughly cauterized; a warm water dressing should be applied, and, if necessary, a purgative administered. To relieve the excessive pain and restlessness anodynes should be freely employed, and if the skin be hot and dry aconite or veratrum viride should be administered.

To meet the typhoid symptoms milk punch, quinine, iron and such other treatment should be resorted to as will support and sustain the patient.

WOUNDS OF THE ARTERIES

may be incised, lacerated, contused or punctured.

When an artery is incised an impetuous hemorrhage of florid blood, flowing in jets with each pulsation, takes place, which, if the artery be large, whizzes through the wound.

The brain ceasing to be supplied with blood, fainting is produced, sensation and volition become suspended, and the action of the heart is in a measure suppressed; the flow of blood from the wound is diminished, and may cease entirely.

If the artery is small it is sufficient to compress the trunk with a tourniquet, and apply gentle and continuous pressure.

When the artery is large, if necessary, make an incision, so as to expose the wounded portion, and apply a ligature above and below each portion of the artery.

If the artery is not completely divided, it is best to complete the division of the vessel, when, if the hemorrhage does not cease, apply a ligature.

Lacerated arteries, when torn across, contract almost immediately, and bleed but little; the most approved method is to apply ligatures; otherwise, when reaction takes place and the power of circulation is restored, hemorrhage will ensue.

Punctured wounds are followed by a tumor, bearing the characters and requiring the treatment of aneurism.

Contused wounds, such as are produced by severe bruises or by gunshot wounds, sometimes destroy the vitality of a portion of the artery, which is frequently followed by sloughing and fatal hemorrhage. In these cases the patient should be kept at rest until the sloughing process is completed. A precautionary tourniquet should be placed around the limb, and the patient instructed in its use in case hemorrhage should ensue.

If an artery of small size be cut across, there will be brisk hemorrhage for a time, but it will soon cease; the divided artery contracts and the vessel retracts within its sheath, and there is coagulation of the blood upon the face of the wound, sufficient to temporarily arrest the bleeding. Then the column of blood *inside* the vessel coagulates, and lastly there is exudation of fibrine around and between the cut edges, which seals up the opening permanently by becoming organized.

The coagulum within gradually becomes firmer, adheres to the walls of the vessel, loses its color, and forms, with the impervious end of the artery, a fibrous cord.

If a *very large* artery is wounded and the aperture is large, and the flow of blood not opposed, the loss of blood will be so rapid as to occasion death at once; but if the wound be very small, it may be closed by coagulated blood during syncope, and the patient, if properly treated, may survive.

If the artery be of the second order, as the tibial, the bleeding will most probably cease when syncope supervenes; but when the faintness has passed off, the bleeding will recur, and the patient may die, unless the bleeding be checked by the surgeon.

A puncture or partial division of an artery is sometimes more troublesome than a complete division, because *contraction* and *retraction* are prevented. An oblique cut is likely to bleed obstinately; the aperture may, in favorable cases, be closed by adhesion, the artery remaining pervious; the uniting lymph, not infrequently, is dilated into *false aneurism*.

Treatment. In the wounds of arteries the first indication is to stop the flow of blood. If the wound be small, and there is a bone underneath, the bleeding may be arrested by firm pressure of the finger; if the wound is wide and deep, the forefinger should be passed in, and pressure should be made with it on the exact spot from whence the blood issues, or the bleeding orifice should be seized with the finger and thumb; or the bleeding may be stopped by pressing the main artery above the point of injury; or a tourniquet may be applied; or, if no tourniquet be at hand, a handkerchief, with a stone placed in it, over the artery, may be tied around the limb, and twisted tight with a stick.

The immediate danger being averted, the surgeon next considers the best means of permanently arresting the hemorrhage.

The ligature. If the orifice of the artery projects, it should be taken hold of with the forceps and gently drawn out; then an assistant should tie a ligature properly around it. As a rule, the ligature should consist of small, round hempen thread, well waxed, tied so as to divide the internal coats of the vessel smoothly; if the artery is diseased and brittle, the ligature should be large and not tied too tightly.

If the bleeding orifice cannot be drawn out with the forceps, it may be transfixed with the tenaculum; in some cases it may be necessary to pass a curved needle and ligature through a considerable degree of the flesh, and tie all up together. After tying, one end of the ligature should be cut off, not too close to the knot, and the other must be made to hang out of the wound. The ligature comes away in from five to twenty days, according to the size of the vessel.

In all cases *where it is possible*, a wounded artery must be tied at the wounded part. If this be not practicable, the next best plan will be to tie the artery ascertained to be the wounded one as near as possible to the bleeding point, and repeat this process at the distal side if bleeding occurs from that end.

Acupressure. When it is not advisable to use the ligature acupressure may be resorted to; the method of employing acupressure is by passing a long needle through one of the flaps of the wound in such a way as to compress the bleeding artery; or a small sewing needle may be employed, threaded with a short piece of inelastic iron wire, by which it may be pulled out; this is dipped down in the tissues on one side, then raised up and made to bridge over the vessel, while compressed with the point of the forefinger; this is circumclusion.

FIG. 1.

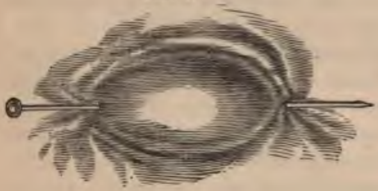


FIG. 2.

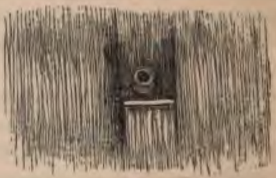


FIG. 3.

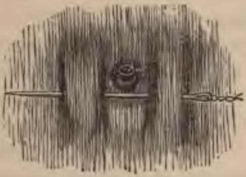
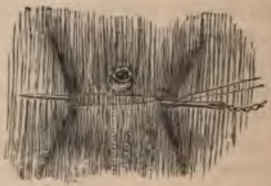


FIG. 4.



In the third method the sewing needle is passed simply behind the vessel, and a noose of fine iron wire passed over the point, brought over the vessel tightly enough to close it, and then secured with a slight twist round the eye end of the needle.

A fourth mode is to use a harelip pin, which is passed under the artery, and a piece of silk or lint passed or twisted around it, sufficiently tight to stop the flow of blood through the vessel.

Torsion. This is performed by drawing out the vessel from its sheath, by a pair of *broad-pointed* spring forceps, and then twisting it around freely, as far as its natural connections will allow; or it may be performed by drawing out the vessel, fixing it by one pair of forceps a quarter or half an inch from the end, and then with another pair twisting the end around until it does not untwist itself.

Pressure is used when the wounded artery is situated immediately over a bone. If possible, the pressure should be confined to the bleeding orifice, and be effected by a *graduated compress.*

Cold is applicable to cases of bleeding from numerous small vessels.

Styptics are frequently used; tincture of perchloride of iron, saturated solution of alum, turpentine, creasote and nitrate of silver are the best. The actual cautery is most potent.

Secondary hemorrhage is that which comes on after the lapse of a few hours, or later, after an injury.

It frequently happens after a wound has been bound up and the parts become warm, sundry small arteries begin to bleed; this is termed by some "*intermediary*" hemorrhage. In this case the wound must be opened, the bleeding vessels secured, the surface sponged with cold water and then exposed to the air for some time.

Secondary hemorrhage may occur from *sloughing* or *ulceration* of an artery, or from imperfect closure of an artery when a ligature separates, either through a diseased state of the artery or of the constitution. In this case it is necessary to cut down upon and secure the bleeding orifice; if this cannot be done, carefully graduated pressure and styptics may be tried. A small button of lint saturated with perchloride of iron may be put into the bleeding point, over which larger compresses are placed and firm pressure applied. The bleeding surface may be touched with a hot iron raised to a "black heat," which will sometimes be more efficacious than any other styptic. Should these measures fail, the artery must be tied above the point of hemorrhage, and finally, amputation may be necessary.

WOUNDS OF THE VEINS.

Hemorrhage from wounded veins is not, as a rule, dangerous, unless from a large and deep-seated trunk in which valves are not present, or from a large varicose vein on the leg. The bleeding, in ordinary cases, may be restrained by pressure and a raised position; it may, in rare cases, become necessary to apply a ligature.

WOUNDS OF THE THROAT.

The usual causes of these injuries are attempts to commit suicide, and the parts injured are the pharynx, larynx, trachea or œsophagus.

In these cases the carotid is rarely injured, owing to the incision being made high up, and to the head being thrown backward.

The larynx is most frequently injured; it is characterized by air and blood issuing from the wound with great rapidity, especially when the patient coughs. The arteries that are usually wounded are the sublinguals. Should the external carotid be divided, death would ensue before assistance could be rendered.

When the wound is above the larynx, the lips of the wound must be carefully brought into apposition and kept in place by sutures. The head must be brought down upon the chest, and confined in that position, in order to prevent a separation of the edges of the wound.

The mouth must be kept cool and moist, and for this purpose a slice of lemon dipped in water, or a wet rag, or pieces of ice, may be inserted from time to time.

The patient should be carefully nourished, by nutrient enemata, with opium added, if necessary, and when food is given by the mouth it is best to commence with semi-solids, such as jelly, etc.

If the wound is in the thyroid or cricoid cartilages, the air rushes through the wound in expiration, and violent coughing is produced. The treatment is the same as the preceding case.

When the wound is inflicted within three inches of the sternum, it is more dangerous than in any other situation; here the trachea is in the forepart, the œsophagus behind, and the carotid arteries are close to the trachea.

In wounds of this kind the first object is to stop the bleeding, and if the wound is not sufficiently large, an incision should be made in a longitudinal direction, to expose the mouth of the vessel, in order to secure it with the least possible delay.

GUNSHOT WOUNDS OF THE CHEST.

These may be divided into the *non-penetrating* and *the penetrating*. The non-penetrating are those affecting the soft parts and the ribs; the penetrating are those in which the lung is directly injured. The missile may pass through entirely or partially, and lodge in the pleural cavity, or it may pass directly through the chest and lung.

Symptoms. More or less collapse, depending on the time that has elapsed since the wound. Face anxious, breathing labored, respirations frequent. Blood expectorated in more or less large quantities; air generally found passing from surface of wound, and usually there is emphysema in the neighborhood.

Treatment. Patient must be placed in bed and careful search made for the ball; when there is no counter opening, the ball may be often found on the opposite side. Splintered fragments of ribs should be removed and any sharp ends of bone rounded off. If the collapse is not severe the patient should not be disturbed, so that an opportunity may be given for clots to form and bleeding to cease.

A light dressing should be placed over the wound and the patient carefully watched.

WOUNDS OF THE ABDOMEN.

Wounds of the walls of the abdomen may be caused by fragments of shell, and large portions of the integuments and muscles may be carried away; bullets and swords will frequently traverse the walls of the abdomen without penetrating, and missiles may strike the abdomen and inflict severe injury on the viscera without external injury.

Penetrating wounds of the abdomen, with or without injury to the viscera or large vessels, are followed by great mortality. If the contents of the abdomen are not injured, the chief danger is from peritonitis. When the viscera are wounded, the severity of the danger, in a great measure, depends upon whether a solid organ, such as the liver, spleen, or kidney, has been injured, or if the stomach or intestines have been perforated.

Wounds of the liver, spleen and kidney are more fatal than those of the stomach and large intestines, and these latter more so than the small intestines.

Symptoms. Great collapse is the first striking symptom; it is very severe if the viscera have been wounded; and is a common cause of death. Frequent vomiting is a symptom common in wounds of the intestines, particularly if the injury be high in the canal. The pain is great; and blood passed from the bowels is a usual symptom.

The after symptoms are those of peritonitis and such as are referable to the particular organ wounded, *e. g.*, blood with the urine, if the kidney be injured; or bile, if the liver, etc., etc.

Treatment. When the cavity of the abdomen is penetrated, place the patient on the bed, carefully examine the wound, and return any viscera that may protrude. If the intestine be wounded, a stitch or two must be

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applied, with the serous surface turned in, so as adhesion may take place. The knot must be cut short and disposed between the stitches.

To relieve pain and to arrest peristaltic action, large and repeated doses of opium are called for.

Where there is only a superficial wound, endeavor to procure union by adhesive plaster and compress, but if necessary, sutures should be used.

WOUNDS OF THE JOINTS.

A wound may usually be known to have penetrated the joint by the escape of synovia, though this is not invariably the case.

Treatment. The first object is to avert inflammation; the wound should be carefully closed, covered with lint dipped in collodion; the limb must be kept absolutely immovable, and for this purpose a proper splint must be applied; the best application to allay pain and to prevent or subdue inflammation, is ice applied to the joint, in india-rubber bags; in the absence of ice, evaporating lotions or cold water should be used.

ANTISEPTIC TREATMENT OF WOUNDS.

Sir Joseph Lister's theory is that putrefaction is not a *chemical* change, but a *vital* one, and that certain germs (Bacteria) are the cause of putrefaction of the wounded surface, especially if the wound has been exposed to the air, if it has been torn or otherwise rendered prone to slough, or if it contain clots of blood, ligatures, or other foreign bodies.

And besides being carried by the air, septic germs may be carried by the fingers, by sponges, instruments, etc.; or the charpie or lint may have been made of foul old linen, and handled by dirty hands.

Upon these views Sir Joseph builds his practice:—

1. The treatment of the wound itself must be such as to render it and its fluids incapable of speedy decomposition.

2. Provide for the entire disinfection of everything that can possibly come in contact with the wound; as the fingers, instruments, sponges, the atmospheric air, etc.

3. Use drainage, so that there shall be nothing pent up capable of putrefying or causing tension.

The antiseptic substance upon which he chiefly relies is carbolic acid.

Before an operation he uses a saturated watery solution for scrubbing and purifying the epidermis of the part about to be operated upon, for cleansing instruments and sponges, and for washing accidental wounds.

Arteries should be tied with carbolized catgut, which is cut short and left to be absorbed.

The wound is closed by suture, except at the place or places where it is considered essential to introduce drainage tubes. The india-rubber tubes vary in size, from that of a crow quill to that of a little finger, pierced with holes at short distances from each other.

Sir Joseph Lister observes that "it is impossible to exaggerate the importance of drainage tubes; in abscesses, they must be employed until they are completely closed; in wounds, not only are they invaluable during the first twenty-four hours, but when the wound is of any considerable depth, they should be used so long as even trifling serous oozing continues."

In many hospitals the following mode of disinfection is observed prior to undertaking an operation:—

Sponges are carefully prepared and then placed, for twenty-four hours, in a solution composed of corrosive sublimate one drachm; salt four and a half drachms; water one gallon.

The surface of the part to be operated upon is washed with a solution of corrosive sublimate one part; water one thousand parts.

The gauze dressing used after an operation is soaked in a solution of corrosive sublimate thirty grains; salt one hundred and forty grains; glycerine four drachms; water half a gallon. Jute is placed over the drainage tubes, to collect the discharge. Instruments, before being used, are washed in a solution of carbolic acid one part; water forty parts.

TETANUS.

Tetanus is a more or less violent and extensive contraction of the muscles of voluntary motion, attended with rigidity and tension of the parts affected.

It begins, generally, with the muscles of the jaw. When it is confined to this part of the body, it is called *trismus*, or *locked jaw*. When all the body is affected, and becomes rigid, but retains its ordinary straightness, the case is one of *tetanus;* when the head is stretched backward, it is called *opisthotonos;* when the body is bent forward, it is called *emprosthotonos;* when the tension is confined to the muscles of one side, it is denominated *pleurosthotonos.*

Tetanus is again divided into *idiopathic* and *traumatic.*

Traumatic tetanus derives its origin from the infliction of wounds, and it arises more particularly from wounds of the extremities; it is produced, most commonly, in consequence of contused, lacerated or punctured wounds. It will occur in all stages of a wound; it usually comes on some days after the occurrence of the injury.

Symptoms. The patient finds a stiffness in the movement of the jaw; he experiences an uneasiness in swallowing, and he soon perceives that he has a difficulty in separating his teeth for the admission of food. He begins, now, to feel a pain behind the sternum, and this pain extends from the pit of the stomach toward the vertebral column. The muscles of the back, and of the neck and back, begin to be affected by spasms, then those of the abdomen, afterward those of the limbs, and lastly those of the face.

The muscles become more and more rigid as the case proceeds. In the extreme period of the disorder all the muscles of voluntary motion are affected; amongst others those of the face; the forehead is drawn up; the eyes are distorted, fixed and motionless; the nose is drawn up, cheeks retracted, and the features undergo an extraordinary change. The spasms become universal, and a violent convulsion puts an end to the misery of the patient.

Idiopathic tetanus arises more frequently in hot climates than in those which are temperate.

Treatment. The indications are to husband the strength of the patient till the disease shall cease; to remove, as far as practicable, all conditions believed to have the power of creating the tetanic state, and to employ any sedative or special treatment from which we may hope to derive advantage.

The chief thing to be attended to is perfect quiet; the room should be kept dark, and the patient kept, as near as may be, in perfect repose; remedies should be administered as gently as possible; everything harsh or violent should be avoided. If nourishment cannot be swallowed, it should be administered *per anum;* it should be as abundant as the nature of the case will admit; the supply of brandy and wine should be abundant. Quinine and iron should be freely administered; opium and morphia have, in many cases, been serviceable; chloral hydrate, chloroform, Indian hemp and tobacco have all been tried, in turn, and sometimes with success.

HYDROPHOBIA.

This disease is the result of poison, caused by inoculation with the saliva of rabid animals.

Symptoms. The first symptom a person experiences who has been bitten by a rabid animal, is pain in the injured part, and this may be felt between the second week and third month after a bite (sometimes a much longer period will elapse). The next symptoms are low spirits, a sense of chilliness, succeeded by rigors and heat; headache, stiffness of the neck, soreness of the throat; then a difficulty of swallowing is felt, not of liquids in particular, but of any substance, so that the patient avoids making an effort; but upon applying a cup to his lips, he will be seized with the most painful shuddering; he will turn away to avoid the sight of what he was about to take, and sit down in a state of exhaustion.

From this time the most prominent symptoms will be difficulty of breathing and swallowing, extreme irritability of the body and disorder of the mind.

Treatment. Immediately after the individual has been bitten, place a tight ligature above the affected part, and, if possible, immediately have the wound vigorously sucked, and then, as soon as may be, cut it out and thoroughly cauterize the whole. Mr. Youatt prefers nitrate of silver, but many authorities place a small piece of potassa fusa into the wound, allow it to dissolve, when its cauterizing influence will be communicated to all parts of the wound.

It does not appear that there is any cure for this affection. The general treatment should be that indicated under the head of tetanus.

SHOCK, OR COLLAPSE.

Shock, prostration, or collapse, are terms used to signify the loss of power which immediately follows severe injuries, especially those attended with violence.

Shock may be caused by any severe injury, especially gunshot wounds, compound fractures, severe burns, protracted surgical operations, and all cases in which serious injury is attended with violence, pain and loss of blood. Mental shocks may be as severe and fatal as those of the body. Sometimes shock is so severe that the patient sinks from it without reaction; this is especially likely in injuries of the vital organs or of the abdominal viscera.

Treatment. The patient must be kept in a horizontal position; all constricting clothing must be removed; free access to the cold air must be provided; cold water should be dashed into his face; a bottle containing dilute aqua ammonia should be held under his nose. If the case is unusually severe, atropia, or tincture of digitalis, or whisky, should be injected under the skin, stimulating injections should be thrown into the rectum. Hot brandy and water, if the patient can swallow it, is probably more efficient than anything else; a few drops of aqua ammonia may be added. A hypodermic injection of morphia (gr. ¼) is highly recommended, to promote respiration. In severe and protracted cases certain symptoms present themselves that demand attention: *vomiting;* the remedies for which are iced soda water, with or without brandy; powdered ice introduced into the mouth and allowed to melt; effervescing draughts; sinapism to the epigastrium; creasote in small doses. *Hiccup* is relieved by the same remedies. Hoffman's anodyne, or chloroform, a few drops on ice, will often prove serviceable. Bleeding, if any exist, must, of course, be checked.

BURNS AND SCALDS.

Burns and Scalds are divided according to their severity; those which produce mere redness, followed by desquamation of the cuticle; and those attended with destruction of tissue.

The danger is proportionate to the extent of injury; burns on the trunk are more dangerous than those of an equal extent on the extremities.

There are three stages: Immediately after the burn there may be symptoms of great collapse. Congestion and serous effusion into the brain and lungs may occur, laborious breathing and coma may follow and soon prove fatal; or the patient may sink during the traumatic fever that follows; or he may die, exhausted, from profuse suppuration or from septicæmia.

A singular accompaniment of severe burns is a liability to be followed by acute ulceration of the duodenum. This may terminate fatally by perforating the intestine and causing peritonitis.

As consequences of burns and scalds, vicious scars are formed, and contiguous surfaces are apt to adhere together, with retraction of the affected part, producing anchylosis of the neighboring joints.

Treatment. Protect the burned part from contact with the air and from all sources of irritation, especially cold. To raise the system from the depression into which it frequently sinks anodynes should be resorted to early and given in large quantities; they should be administered along with hot brandy and water, ammonia to be added, if necessary, and counter-irritants should be applied to the extremities; sinapisms should be applied along the spine.

The severe pain is promptly relieved by the use of bicarbonate of soda, either applied in the form of paste made with water, or freely sprinkled over the raw surface.

Cold applications are useful in many cases, especially in summer; or the parts may be covered with a liniment of equal parts of linseed oil and lime water; or a lead lotion may be applied, or a weak carbolic solution. Carded cotton is a remedy in constant use. When suppuration begins the chalk or oxide of zinc ointment may be used.

Prof. S. D. Gross highly recommends the application of carbonate of lead in the form of white paint. If vesicles exist they must be evacuated with a fine needle and the surface well dried, otherwise the lead will not adhere. He also recommends an application of a weak solution of nitrate of silver, to allay the scalding and smarting sensation. Mucilage of gum acacia, or mucilage of gum acacia mixed with linseed oil or lime water, have been found useful.

If a burn is severe or extensive enough to cause danger to life, the parts should be first bathed with tepid turpentine, then apply a liniment composed of ung. resinæ, ℥j, ol. terebinth., ℥ss, thickly spread on lint, and then wrap in cotton wool and flannel; or resin ointment, with equal parts of resin ointment and of lard or oil, may be used, melted together, and ten drops of creasote to the ounce may be added. The dressing should be allowed to remain as long as possible, and should not be removed unless there is a profuse discharge, or bad smell, from the affected parts.

Ulcers resulting from deep burns are often extremely intractable; they secrete pus profusely, and often many months elapse before they are healed.

In such cases, mild stimulants and astringents are advisable; especially carbolate of zinc lotion and bismuth ointment. When the discharge is very profuse, the sore should be kept constantly covered with finely powdered chalk.

CHILBLAIN—FROSTBITE.

Severe cold causes an erythematous inflammation of the skin, described as frostbite, the effects of which are designated as chilblain.

The portions of the body that usually suffer are the fingers, tips and lobes of the ear, end of the nose and the toes.

When the air is loaded with moisture, chilblain is much more apt to be produced than when the atmosphere is dry.

When a person has been exposed to very severe cold, and especially if he has been exhausted by fatigue, hunger and watching, he feels an irresistible impulse to sleep, which, if yielded to, will soon end in coma and death.

The best remedy for a frostbite is to rub the part well with snow; if snow be not attainable, cold water must be substituted. These applications to be made in a room without fire; and a high temperature must be avoided for some time.

If the cold has induced coma, the best remedy is friction with flannel all over the surface of the body.

Warm drinks must be administered, such as coffee, tea, weak wine and water, to which a few drops of aqua ammonia may be added; if the patient cannot swallow, an injection of milk with a little brandy may be resorted to. When reaction is restored, the temperature of the room may be gradually raised.

Stimulating applications are to be used to relieve the itching and burning that accompanies chilblain; of these, tincture of iodine painted over the part; Wardrop's liniment, consisting of tinct. cantharides, ʒiij, linimentum saponis, ʒix; turpentine, dilute carbolic acid, are most highly recommended.

Cod-liver oil, quinine and tonic treatment generally, are necessary.

TUMORS.

Tumors are swellings caused by morbid growths.

Lücke defines a tumor to be "an increase in volume, by the growth of new tissue, which does not perform any physiological function."

Tumors are developed from cells, and are supplied with vessels, nerves and lymphatics, in varying degrees of abundance. The rapidity with which they grow depends upon the nature of the growth, on the condition of the organ affected, and on the age of the patient attacked.

Tumors are subject to disease, just as are healthy structures, and may undergo the same pathological changes. They are also subject to inflammation. Interstitial hemorrhages are common to some tumors; they also ulcerate, either as the result of injury, or the result of natural tendencies.

Women are more liable to tumors than men, as are also the dark races and inhabitants of hot countries. In certain families the tendency seems to be hereditary. Young persons are more liable to tumors of the connective-tissue type, and the aged to the epithelial.

Tumors may be divided into benign and malignant. The marks of a benign tumor are, they are circumscribed and movable, and not blended with the surrounding structures, and, although multiple, they are found in the same tissue; they are compatible with good health, though by enlargement they may cause œdema or paralysis, by pressing on arteries or nerves, or they may disturb the skin and slough; these are local consequences, and cease if the tumor be removed; and if effectually removed, do not return.

The malignant tumors tend to infiltrate and become blended with the adjoining parts; they cannot move freely, and they adhere to the skin over them; they are frequently of rapid growth, and very painful; unless completely removed, they return in the same place. Some travel along the lymphatics and affect the nearest glands, and others are diffused over the body by means of the blood vessels. They generally lead to exhaustion and death.

The anatomical classification established by Hughes Bennett and Lebert, and confirmed by all later authorities, is set forth in the annexed table; there are two chief subdivisions, the connective-tissue series, and the epithelial. The cysts are considered separately.

A. Connective Tissue Series.

Normal Type Tissue.		*Embryonal Tumor.*
Fibrous tumor.	Fibroma.	Sarcoma.
Fatty tumor.	Lipoma.	Myxoma.
Cartilaginous tumor.	Chondroma.	Chondro-sarcoma.
Bony tumor.	Osteoma.	Osteo-sarcoma.
Muscular tumor.	Myoma.	Myo-sarcoma.
Lymph gland tumor.	Lymphoma.	Lympho-sarcoma.
Vascular tumor.	Angioma.	
Nerve tissue tumor.	Neuroma.	

B. Epithelial Tissue Series.

Typical.		*Atypical.*
Warty tumor.	Papilloma.	Cancer, *a*. Scirrhus.
Gland tumor.	Adenoma.	*b*. Encephaloid.
		c. Colloid.
		d. Cylindroma.

C. Cystic Tumors.

The ***fibrous tumor*** consists of fibrous tissue; sometimes white, glistening and hard, resembling tendon; and at other times, softer, yellowish in color, and containing fat within its meshes. There are two varieties, the *hard* and the *soft*. The hard are mostly found in connection with the periosteum, the fascia and the nerve sheaths; the soft in the skin and submucous tissue.

These tumors are usually hard, elastic, free from tenderness, smooth, oval or pyriform; of slow growth, lasting any number of years.

The only treatment is extirpation.

The *fatty tumor,* or lipoma, consists of fat tissue intersected in the meshes of fibrous bands, and contained in a fibrous capsule.

They are soft, movable and lobulated, sometimes semi-fluctuating, or feeling like fat, half fluid at the temperature of the body, and free from pain and tenderness.

The most usual situation is the subcutaneous tissue of the trunk, especially about the back of the neck and shoulders.

Treatment. Removal by the knife.

The *cartilaginous tumor,* chondroma or enchondroma, consists, for the most part, of cartilage, identical with normal cartilage. They are firm and smooth, usually somewhat nodulated, sometimes hard and sometimes so soft as to be taken for cysts. Their usual situation is on or within the bones, particularly those of the hand; if developed within the bone will cause it to expand into a thin shell.

The growth is usually slow; they are more frequent in early life. They are often multiple and hereditary. They, as a rule, do not return when thoroughly excised, though to this there are numerous exceptions.

Bony tumor, or *osteoma,* is generally circumscribed, rounded and flattened, pedunculated, more or less irregular in size and shape. The most common form is *exostosis;* generally found at or near the articular extremities of the long bones. They frequently exist on the dura mater; they have also been found on the larynx, bronchi and muscular substances.

The growth is exceedingly slow. As a rule, an operation is not advisable; when of recent formation, an attempt should be made to procure absorption by iodide of potassium. Constitutional treatment should be commenced early and persevered in.

Muscular tumor or *Myoma.* Tumors of the unstriped variety occur chiefly in the uterus; they are also found in the œsophagus, stomach and prostate gland, as well as in the scrotum of man and the labia majora of woman.

The lymph gland tumor, or Lymphoma, consists of lymphatic tissue. It is found everywhere on the body; essentially consists of delicate network, formed by the branches of stellate cells, and containing elements similar to those of chyle or lymph.

Treatment. General tonics, cod-liver oil, iron, change of air, etc. Good results are obtained from hypodermic injections of ten minims of alcohol, twice a week, into the tumor.

These measures failing, recourse must be had to the knife.

Vascular tumors, or Angioma, are vascular growths which consist of active hypertrophy, or extension in length and calibre of existing vessels, with the growth of new ones. The two chief varieties are the simple angioma (nævus), and cavernous angioma (erectile tumor).

Nerve tumor, or *Neuroma*, consists of hypertrophied nerve tissue, is most rare, except as evidence of an abortive attempt at union of a divided nerve, when the divided ends retract and become bulbous. They may become exceedingly painful, and require to be cut out.

Embryonic connective tissue tumors, or *Sarcomata*, present many varieties, as the round-celled sarcoma, the spindle-celled sarcoma, giant-celled sarcoma, myeloid sarcoma, melanotic sarcoma.

Myxoma; osteo-sarcoma, chondro-sarcoma, myo-sarcoma, and the like compound terms, are applied to sarcoma when arising from or intermixed with some development of bone, cartilage or muscle respectively. As regards clinical characters, the sarcomata are malignant growths. They occur, for the most part, in early and middle life. They are rapid in their growth, tend to extend locally by infiltrating surrounding tissues, and after extirpation to recur at or near their formation.

Sarcomata may be extirpated completely and never recur, or may return several times after operation, and finally become disseminated in distant parts of the body.

Epithelial growths are divided into two classes, the typical and the atypical. The typical consists of an overgrowth of normal epithelium, growing toward the surface. The most simple form is the ordinary wart.

The atypical is a proliferation of epithelium into parts beyond those in which it is normally found; this constitutes epithelial cancer.

The most common form of *papilloma* is the ordinary wart.

Glandular tumor, or *Adenoma*, is the term by which all glandular tumors are now designated.

They generally grow very slowly, are not painful; they are firm and elastic; they are freely movable and the adjacent skin is unaltered; the nipple remains unaffected. On cutting into them they present a lobed construction, not unlike an indurated pancreas. The tumor should be removed as soon as recognized.

ATYPICAL EPITHELIOMA—CARCINOMA.

This may be defined as "a tumor consisting of an alveolated fibrous stroma, the alveoli of which contain epithelial cells." It is a malignant growth.

Of the atypical, there are scirrhus, encephaloid, colloid and cylindroma.

In the first stages of all the varieties of carcinoma the disease may begin insidiously, and may perhaps only be discovered by accident; soon the tumor begins to grow faster and to adhere to and infiltrate neighboring tissues and the neighboring lymphatics. Pain is severe, intermitting and neuralgic, gradually increasing in severity; felt in the tumor as a sharp, burning sensation; often disturbing the sleep; sometimes it is not felt until the disease is far advanced.

The tumor of scirrhus has its stroma undergoing change into cicatricial tissue at the centre, but extends, in a great degree, at the circumference. Ecchymosis, abscess or ulceration may occur. Those most prone to ulcerate are those of the skin, breast and stomach.

The constitutional symptoms are those of an increasing cachexia, pain, discharge, and an interruption of function. The complexion becomes sallow, the lips pale, the mind despondent, digestion feeble, the flesh and strength waste, and the bones become light and fragile.

Diagnosis. Position is all important. Lücke says, "After the fortieth year of life, the diagnosis of carcinoma is almost always the correct one; between thirty-five and forty years of age the most probable one, and before this age improbable." Carcinomatous tumors are remarkable for their "*stony hardness.*" They grow slowly. The pain is characteristic. The corresponding lymphatic glands become early affected.

TREATMENT OF CARCINOMA.

It is generally conceded that the knife should be early resorted to, provided it can be carried beyond the supposed limits of the disease. The diseased mass must be thoroughly and entirely removed.

Much may be done for the patient in the way of invigorating and strengthening his constitution; a good, light diet and the preparations of quinine and iron may be used, to keep up the appetite and combat the cachexia.

Opiates may be given, to relieve pain.

Local applications. Before ulceration, belladonna plaster, chloroform liniment, to relieve neuralgic pains.

For the ulcerated stage, *soothing applications* include opiate and conium lotions; poultices; chalk, lead or bismuth ointments. *Stimulating:* as the black wash, carrot poultice, yeast poultice, zinc or nitrate of silver lotions. The *astringent* lotions of iron or tannin. *Antiseptic:* lotions of chloride of soda or of zinc; creasote; carbolic acid, or sulpho-carbonate of zinc, combined with water, oil or glycerine, to which a little chloroform may be added.

CYSTIC TUMORS.

Tumors containing cysts. These are *bursæ*, or collections of fluids in the cavities of the connective tissue; ganglia, collections of liquids in the sheaths of tendons; *sebaceous cysts or wens*, formed by the obstruction or non-development of ducts to the skin glands; *mucous cysts*, as *ranula*; *milk cysts*, formed by the dilated tubules in the breast.

ANEURISM.

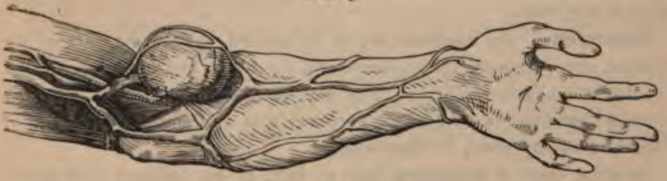
Aneurism is a pulsating tumor, containing blood, and communicating with the interior of an artery.

An aneurism consists of a sack formed by one or more of the arterial tunics.

There are two varieties: the *sacculated*, which is formed into pouches, and the *dissecting*, in which the blood finds its way between the arterial tunics.

Aneurism usually commences by a giving way of the internal and middle coats of the artery, at the site of some softened spot, after which the pressure of the blood dilates the external or cellular coat into a pouch. It may commence by the dilatation of all three of the tunics.

FIG. 5.



VARICOSE ANEURISM.

It gradually dilates under constant pressure of the heart's impulse, becomes lined with coagula deposited in distinct laminæ.

Symptoms. If it is an external aneurism it may be recognized by the following symptoms: At first there is a small tumor, pulsating strongly, and if the finger is applied to the artery between the aneurism and the heart, the aneurismal sac will be readily emptied by pressure; in the second stage, the blood is beginning to coagulate in the interior of the sac, the coats, at the same time, having become thickened. If the artery be now pressed upon, the sac will be emptied in part, and the swelling will be reproduced when the pressure is abandoned. There is some degree of pain and the circulation is retarded, in consequence of the pressure.

When the aneurism reaches the third stage, it has acquired considerable magnitude, and the pulsation is, in a degree, lost; a small portion of the blood still remains fluid, but the greater part is filled with coagulum.

In internal aneurism the symptoms vary, according to the seat in which the disease is found; the digestive organs will be at fault at one time, the urinary at another, and so on, depending on the part upon which the aneurismal tumor presses.

Diagnosis. Other tumors situated over arteries may be distinguished from aneurism, by observing that they do not pulsate at first, when they are small, whereas aneurisms do so from their earliest formation; that a tumor may often be lifted up from the artery, and that then it will cease to pulsate; that aneurisms are generally soft at first and become hard afterward; tumors are generally the reverse; tumors cannot be emptied by pressure, and no alteration is made in their size or consistency by compressing the artery above.

The predisposing cause of aneurism is some preëxisting degeneration of the arteries, which may be preceded by habitual overstrain. Sir A. Cooper speaks of a case where there were seven aneurismal tumors in different parts of the body.

Treatment. *By compression;* it is applied upon some part of the affected artery between the aneurism and the heart, and in such a way as to retard the circulation and so cause deposits of laminated fibrine. *Carte's* circular tourniquet is used for the purpose; also Gibbon's modification of Charriere's compressor, or Hoey's clamp.

In some cases a five-pound bag of shot, or an ordinary four-pound weight may be placed over the artery, with a pad intervening, or "*digital compression*" may be used; kept up by relays of assistants, the patient, if necessary, being kept under the influence of chloroform or morphia.

The advantages of compression are, that it can be discontinued at once, if need be; secondary hemorrhage, the frequent accident of the ligature, is obviated; and even if it fails the knife can still be resorted to.

Compression is contraindicated when the integuments are inflamed, or the limbs much swollen, from venous obstruction, and also in cases which are very rapidly increasing.

The pressure should not be severe enough to cause great pain, and if there is room, it should be applied at two or three points in the course of the artery. If very restless, the patient may be gently chloroformed, or kept quiet by morphia for two or three hours at a time, and not carried to the point of completely closing the vessel.

By ligature. When compression is inapplicable or unavailing, the artery must be secured between the aneurism and the heart, by the "Hunterian Method." The place of election must be neither too near the aneurism, so as to tie a portion of the vessel that is diseased, nor too far from it, lest the circulation through it be kept up too freely by means of collateral branches. The direction and extent of the incision obviously depend on the situation of the artery to be operated on. A healthy portion of the artery is selected, great care is taken, in exposing the vessel, to disturb the sheath as little as possible, and but one ligature is used; it is drawn so tightly that the inner and middle tunics are divided; a double knot being made, one extremity is cut off, and the other is brought out at the nearest point of the wound, which is then treated in the ordinary manner.

In separating the artery from its accompanying veins, the greatest care must be taken not to inflict injury upon this vessel.

HERNIA.

Hernia is a term used to signify the protrusion of any viscus from its natural cavity, but surgeons generally confine it to protrusions of the viscera from the cavity of the abdomen.

There are many varieties of hernia, depending upon the parts in which they occur, or according to their contents.

Herniæ most frequently make their appearance at the groin, the navel, the labium pudendi, and the upper and fore part of the thigh.

Inguinal hernia is the name when the hernia protrudes at the abdominal ring.

Scrotal hernia, if the parts descend to the scrotum.

Femoral hernia, when it takes place below Poupart's ligament.

Umbilical hernia, when the bowels protrude at the navel.

Ventral hernia, when it occurs at other parts of the abdomen.

Congenital hernia, when the parts have not any proper peritoneal sac but are contained in the *tunica vaginalis testis*.

From the contents of the hernia, they are said to be either enterocele, epiplocele or entero-epiplocele.

Enterocele, if a portion of the intestines alone forms the contents of the tumor; Epiplocele, if omentum only; Entero-epiplocele, if both intestine and omentum.

Herniæ are said to be—

Reducible, when the protruded bowels admit of being readily returned to the abdomen; *irreducible*, when the protruded bowel suffers no constriction, but cannot be returned to the abdomen, owing to adhesions, or to their large size in relation to the aperture through which they have to pass.

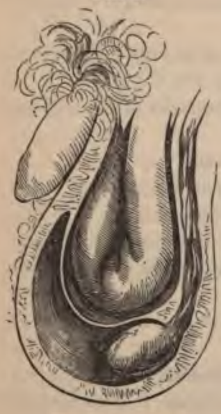
Strangulated. Is one which not only cannot be reduced, but suffers constriction also.

The predisposing causes are deficiencies of resistance, resulting from relaxation, formation or otherwise; the principal are a preternaturally large size of the openings at which the bowels are likely to protrude; a weakness and relaxation of the margins of these apertures, and a laxity of the peritoneum.

The exciting causes are the powerful action of the abdominal muscles and diaphragm, accidental blows, great muscular action, obesity, wearing tight clothes, pregnancy, jumping, etc., etc.

Symptoms. *Of reducible hernia* are, a swelling at some point of the abdomen, which is subject to change of size, being smaller when the patient lies on his back, and larger when he stands up and holds his breath. It diminishes when pressed, and grows larger when the pressure is removed. Frequently, in consequence of the natural situation of the bowels, patients affected with hernia are troubled with colic, constipation and vomiting.

FIG. 6.



SCROTAL HERNIA.

If the case be one of intestinal hernia, it will be characterized by the uniformity of its surface; a gurgling noise is often made when the bowel is ascending.

If the hernia is *omental*, the tumor is more flabby and has a more unequal feeling; it is generally indolent.

If it is *entero-epiplocele*, the characteristic marks are less clear, being a combination of the symptoms which attend the simple cases.

Sir Astley Cooper has observed that the danger of hernia is in proportion to the smallness of its size.

Treatment. 1st, a reducible hernia must be returned to the cavity of the abdomen without delay, and as soon as the parts are returned a suitable truss must be put on, and worn without intermission.

Irreducible Hernia. The most frequent causes that prevent the ordinary reduction of hernia are either the largeness of the contents, alteration in its form and texture, adhesion of parts and formation of membranous bands within the sac. If the tumor cannot be returned, and no unpleasant symptoms attend the case, the only thing to be done is to keep the parts in a suspensory bandage, to prevent an increase of the malady.

Strangulated Hernia. The indications of a strangulated hernia are a tumor in the situation of the rupture, attended with pain over the whole abdomen, sickness and inclination to vomit, suppression of stools and some fever. If the reduction be delayed the vomiting becomes very frequent; all the contents of the stomach, and afterward of the intestines, are rejected. There is great anxiety and restlessness, with cold extremities and a small, quick and hard pulse. Then hiccough comes on, the pulse is hardly perceptible, respiration weak, and the whole body is covered with a cold, clammy sweat. The protruded viscus now begins to mortify; the patient suddenly becomes easy, the swelling of the belly subsides, and the tumor diminishes, and the skin sometimes changes to a livid hue; its feeling is emphysematous, and crepitates on being touched. In this state the gut returns to the abdomen spontaneously, or is readily returned, and the patient fancies himself better. This feeling is, however, of short duration; hiccough and cold sweats increase, convulsive symptoms come on, and the patient soon expires.

The immediate cause of these bad symptoms is the stricture made on the prolapsed part of the gut by the aperture through which it passes; consequently, its removal is the only thing that can bring relief, and this object is to be accomplished by returning the bowel into the abdomen, or dividing the parts which form the stricture.

The remedies generally employed before an operation is resorted to, are the taxis, chloroform, bleeding, cold applications, the hot bath, 96°–100° F., a large dose of opium or morphia, the tobacco injection, purgatives and enemata.

The Taxis. The bladder having been emptied, the patient should lie down in an attitude of complete repose, and be put under the influence of chloroform; if this is not used, he should be put in a warm bath, both thighs flexed and placed close to each other, so that every muscle and ligament connected with the abdomen may be relaxed; then the surgeon grasps the lower part of the tumor with the palm of one hand, gently compresses it, and with the fingers of the other gently kneads the parts at the neck of the tumor, occasionally drawing them very gently downward, in order, if possible, to dislodge them. If the tumor be not tender, this operation may be continued for half an hour, when the gurgling sound which accompanies the return of the intestines may be heard.

If taxis and chloroform fail, before operating, the remedies above enumerated should all be tried in turn.

Having gone through the general treatment of herniæ in their respective stages, they are now to be spoken of specifically.

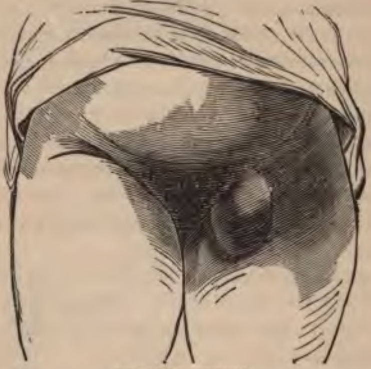
There are four varieties of abdominal hernia to be described; viz., *inguinal, femoral, umbilical, ventral.*

Inguinal Hernia. There are three kinds of inguinal hernia: the oblique, direct and congenital.

Oblique Inguinal Hernia. This variety takes the course of the spermatic cord; it begins with the cord as it passes out of the abdomen, and follows the direction of the inguinal canal; its course is oblique, and on this account is so called.

With respect to the parts about the hernial sac; the spermatic cord is behind, the testicle below, the internal oblique and transversalis above, and the fascia transversalis beneath it.

FIG. 7.



FEMORAL HERNIA.

Direct Inguinal Hernia. In this case the hernia does not follow the course of the spermatic cord, but comes out almost directly through the external abdominal ring, and pushes before it the fascia transversalis. It passes on the *inner side* of the epigastric artery, and directly as it emerges from the ring is received under the fascia of the cord, which forms one covering, and passes into the scrotum.

Direct inguinal hernia may be known from oblique: first, by tracing the spermatic cord, it will be found that in direct hernia the hernia is *behind* the cord, whereas in oblique it is *before* it; secondly, when the mouth of the sac is traced, in oblique hernia, it will be found *above* the abdominal ring, toward the spine of the ilium; but in direct hernia, there is an inclination *inward* toward the umbilicus.

Congenital Hernia. In this hernia the protruded parts have not any proper peritoneal sac, but are contained in the tunica vaginalis of the testicle, which serves as the hernial sac.

Femoral or Crural Hernia. The seat of femoral hernia is the upper and fore part of the thigh, the protruded intestine, passing out at the same opening through which the large blood vessels are transmitted to the thigh, and consequently, under Poupart's ligament. It is most frequently met with in women.

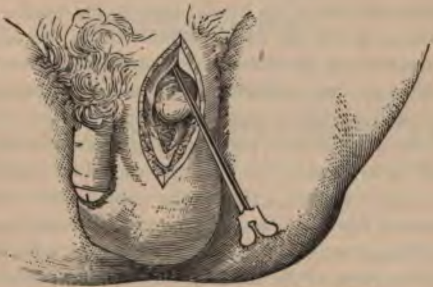
The characteristic symptoms of femoral hernia are its situation with respect to inguinal hernia; its capability of reduction, with regard to bubo.

Umbilical Hernia. In this hernia some of the viscera of the abdomen, more frequently omentum, pass out at the umbilicus, through an opening in the linea alba, and, as in other varieties of hernia, are included in a sac formed by the peritoneum.

Ventral hernia differs from umbilical in its seat, which is usually at the linea alba, or linea semilunaris; but any visceral protrusions at the anterior or lateral parts of the abdomen, except those already described, may be called ventral hernia.

Operation. Having used the means for reduction already pointed out, without success, an operation becomes necessary.

FIG. 8.



OPERATION FOR OBLIQUE INGUINAL HERNIA.

Oblique Inguinal Hernia. The patient should be placed upon a table, with legs hanging over; remove the hair; commence the incision from the upper part of the tumor, and carry it along the middle to the lower part. By the first incision the fascia of the cord is laid bare, and in doing this the external pudendal artery, which crosses directly opposite the abdominal ring, is divided; this must be secured; then scratch through the fascia of the cord just below the ring, introduce a director upward to the abdominal ring and inferiorly to the lower part of the swelling, and divide the fascia. The fibres of the cremaster are then brought in view; this covering is somewhat dense and must be opened with care; a director is introduced under it, as far as the fascia of the cord, and it is then divided; when this is done, the hernial sac is exposed; it is of a bluish appearance and semi-transparent, from the fluid it contains. Having laid bare the sac, pinch it and feel distinctly the intestine and omentum within. Raise the sac, to separate it from its contents, and make a small cut into it, in a lateral direction; place the instrument horizontally, to avoid the danger of wounding the intestine. As a rule, if the intestine be included in the sac, water escapes as soon as an opening is made. Having opened the sac, a director is to be introduced as far as the abdominal ring, which is then divided; the director is then to be carried into the lower part of the sac, in the same manner. When both omentum and intestine are in the sac, the omentum will be found before, and the intestine behind.

After having opened the sac, next feel for the stricture; put the little finger in the hernial sac, and ascertain if the stricture is situated at the abdominal ring, and then pass a probe-pointed bistoury, guided on the finger, and divide the stricture, not freely, but to a small extent; a slight motion of the knife will do.

The stricture does not generally exist at the external ring; it is usually situated at the upper part of the hernia, opposite the tendon of the transversalis muscle, or in the sac itself. When this is the case, slit up the abdominal ring, hook up the abdominal muscles, and draw them upward toward the abdomen, then pull down the hernial sac; the stricture is thus exposed. Then divide the stricture in the centre and *cut directly upward*, let the hernia be where it may, and the danger of wounding the epigastric artery will be avoided. The intestines should be returned piecemeal to the cavity of the abdomen, and then the omentum will follow them.

Direct Inguinal Hernia. In operating on these cases it must be borne in mind that the spermatic cord is placed on the outer side; that the hernia is covered by the fascia of the cord, by the cremaster partially, and is contained in a sac, formed by the tendon of the transversalis muscle, assisted by the fascia transversalis, beside a peritoneal sac. The division of the stricture must, therefore, be *directly upward.*

Congenital Hernia. *The seat of stricture* will be usually found under the edge of the transversalis muscle, or at the internal ring, when it should be divided in the same manner as in other cases of hernia.

Femoral Hernia. The first incision is made in the course of Poupart's ligament, along the tumor, extending from one side to the other; the second cut is made at right angles to the first, toward the umbilicus, so that the two incisions resemble the letter T inverted. The flaps are then dissected off and reflected. This exposes the superficial fascia, which is next divided, and the *fascia propria* is then brought into view; cut through this and the peritoneal covering presents itself. Then make an incision, with the greatest care, and introduce a director, to ascertain the seat of stricture. Having opened the hernial sac and exposed the intestine, divide the stricture directly *upward and inward*, a little inclined to the umbilicus. The seat of stricture is at the posterior edge of the crural arch, just where the intestine leaves the abdomen; therefore, in dividing the stricture, after introducing the director, a bistoury, blunted at the point, is to be put on it and placed against the stricture; in this way there is no danger of wounding the intestine. The bistoury is next gently raised, and, with a slight touch of the instrument, the fibres will give way.

Umbilical Hernia. First make an incision across the tumor and then another at right angles, so that it will resemble the letter T inverted. The integument being divided, the corners of the incision are to be turned aside, by which the sac will be brought into view. This being carefully opened, the finger is to be passed into the orifice of the sac at the umbilicus and a blunt-pointed bistoury introduced. The stricture is to be divided *upward*, in the direction of the ensiform cartilage.

DISLOCATIONS.

A dislocation is the removal of the articulating portion of a bone from that surface to which it is naturally connected.

DISLOCATION OF THE LOWER JAW.

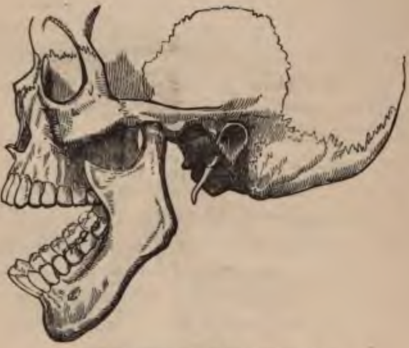
A blow on the chin when the mouth is widely opened will cause this dislocation. Yawning will also produce it.

Symptoms. Both condyles are advanced between the surface of the temporal bone and zygomatic arch; the mouth is open, and the patient is not able to shut it by pressure made on the chin; the lower teeth are on a line anterior to the upper; the appearance is that of a person yawning; the pain is severe; the saliva is increased and dribbles from the mouth.

If the lower jaw is partially dislocated one condyloid process only advances, while the other remains in its articular cavity.

Reduction. If recent, this dislocation is reduced by wrapping a handkerchief around the thumbs, placing them on the coronoid processes, and depressing the jaw, force it backward as well as downward, and the bone suddenly slips in its place. If this does not answer, the following method is to be tried: The patient being seated, his head supported by an assistant, the surgeon, standing in front, introduces his thumbs into the mouth, as far back as possible upon the molars, and places the fingers of each hand under the chin and base of the jaw. Using his thumbs as fulcrums, the back part of the jaw is forcibly depressed, to disengage the condyles from the zygomatic fossæ, and at the same moment the chin is elevated by the surgeon's fingers. The thumbs of the operator are to be thoroughly protected by the folds of a handkerchief or napkin.

FIG. 9.



DISLOCATION OF THE LOWER JAW.

If the dislocation has existed some time, the better plan is to place some yielding substance, like cork, behind the molar teeth, on each side of the mouth, and then raise the chin over them.

DISLOCATIONS OF THE CLAVICLE.

The sternal end of this bone may be dislocated forward, and also backward; more frequently forward, when it is thrown upon the upper part of the sternum.

When the dislocation is in front of the sternum, the reduction is easily effected; place your knee against the spine, draw the shoulders backward, and the clavicle will assume its natural position; then apply the clavicle bandage, placing a pad on the displaced end of the bone.

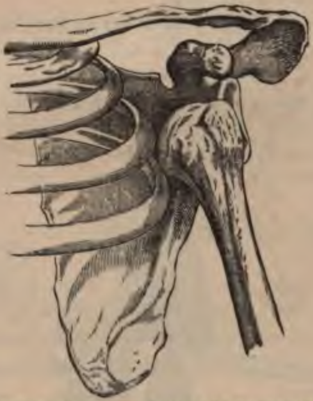
The dislocation behind the sternum is a very rare occurrence; it may be produced by curvature of the spine; if so, there is no mode of reducing it.

The *outer extremity* of the clavicle is most frequently dislocated upward on the acromion. The shoulder will be depressed and drawn inward toward the sternum; the end of the clavicle can be felt on the acromion by tracing the spine of the scapula. After reduction, the treatment is the same as for fracture of the clavicle.

DISLOCATIONS OF THE HUMERUS.

First Dislocation. *Downward* into the axilla, which is most common.

FIG. 10



DISLOCATION OF THE SHOULDER DOWNWARD.

Symptoms. The arm is lengthened; a hollow is felt under the acromion; the shoulder is flattened externally; the elbow sticks out from the side and cannot be made to touch the ribs; the head can be felt in the axilla.

Second Dislocation. *Forward* beneath the clavicle, upon the second rib, the coracoid process being on the outer side.

Symptoms. The arm is slightly shortened; elbow projects backward; the acromion seems pointed; the depression of the deltoid is more considerable than in preceding case.

Third Dislocation. *Backward* on dorsum scapula, beneath the spine, where the head of the bone is readily felt and follows the movement of the elbow when rotated.

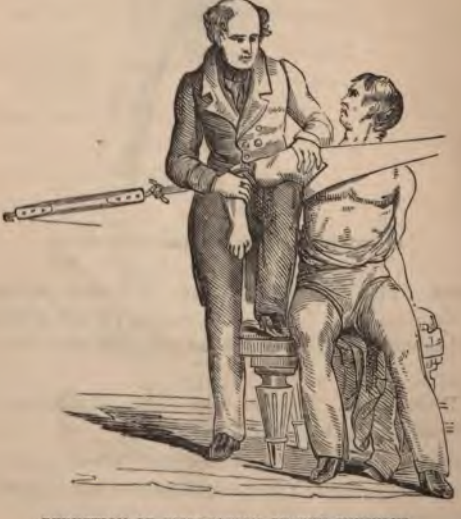
Fourth Dislocation. Is partial; the bone is thrown forward against the coracoid process; the *symptoms* are projection of the acromion and a hollow under it, while the head of the bone is prominent in front and may be felt to move on rotating the elbow.

Treatment. There are many methods of reducing dislocations of the shoulder: 1. *Simple extension.* A towel is passed around the chest, under the arm and crossed above the shoulder, so as to firmly fix the scapula; another towel is fastened around the arm above the elbow; extension is then made with the latter, the patient sitting.

When extension is made for a few minutes, gently roll, shake and lift the head of the bone with the knee.

2. *Heel in the Axilla.* The patient lies on the bed; the surgeon sits on the edge. He puts his heel into the axilla, presses the head of the bone upward and outward, and at the same time pulls the limb downward and a little forward, by means of a towel secured around the arm above the elbow.

FIG. 11.



REDUCTION OF DISLOCATION OF THE HUMERUS.

Knee in the Axilla. The patient is seated in a chair, and the surgeon places one knee in the axilla, resting his foot on the chair. He then puts his hand on the shoulder, to fix the scapula, and with the other depresses the elbow over his knee.

1. *Reduction by the Perpendicular Method.* The scapula is fixed by placing one hand on the shoulder; the arm is then raised from the side and drawn straight upward till the bone is elevated into the socket.

The extension used in any dislocation *forward* must be made in a direction downward and backward. For dislocation backward the extension must be made forward.

After reduction a small pad should be placed in the axilla, and the arm and shoulder supported for some days with a sling, and a roller to confine the arm to the trunk.

DISLOCATIONS OF THE ELBOW.

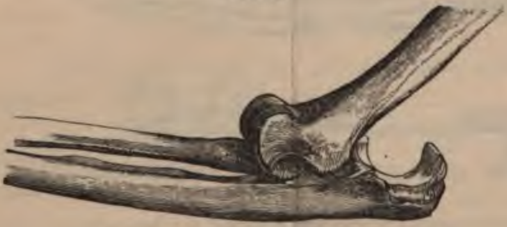
The elbow may be dislocated in five directions.

First. Both bones backward, strongly marked by alterations in the form of the joint and loss of motion; there is considerable projection found posteriorly by the ulna and radius; on each side of the olecranon there is a hollow; the hand and forearm are in a state of supination and cannot be turned prone.

Second. Elbow dislocated laterally; ulna thrown on either the external or internal condyle.

Third. The third dislocation is backward. The deformity is very great; the forearm and arm are twisted inward, and the olecranon projects considerably. The forearm cannot be extended, nor bent to more than a right angle.

FIG. 12.



DISLOCATION OF THE ULNA BACKWARD.

Fourth. The radius thrown forward into the hollow above the external condyle of the humerus. The forearm in this dislocation is slightly bent, but cannot be brought to a right angle. The hand is between pronation and supination.

Fifth. Radius backward. Very rare and seldom seen.

Treatment. The first, second and third dislocations may be reduced by seating the patient on a chair; then take hold of his wrist; put your knee on the inner side of the elbow joint; bend the forearm, and at the same time make pressure upon the dislocated bones, so as to separate the coronoid process of the ulna from the posterior fossa of the humerus. While the pressure is kept up by the knee, the arm is forcibly and gradually bent, and the bones will slip in their places.

In the fourth dislocation the hand should be turned supine, the forearm should be bent, and extension made from the hand, without including the ulna.

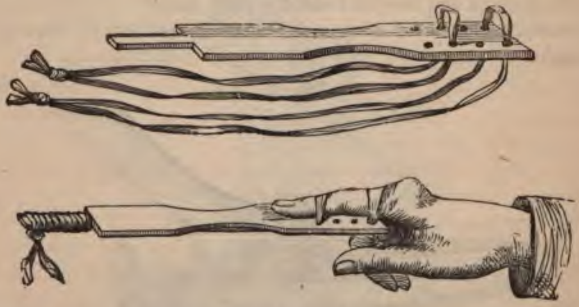
DISLOCATIONS OF THE WRIST

Are of three kinds, viz.: both bones; radius forward; and the ulna backward. They are readily distinguished by the altered position of the hand, which is thrown either backward or forward, or twisted on its axis. They are reduced by simple extension.

DISLOCATIONS OF THE FINGERS AND TOES.

These are accidents of rare occurrence. When dislocations of the fingers take place they are generally found between the first and second phalanges. The diagnosis is easy when the dislocation occurs at this place; there is a projection of the first phalanx backward, while the head of the second phalanx can be felt on the forepart, though less distinctly.

FIG. 13.



REDUCTION OF DISLOCATION OF INDEX FINGER, AND APPARATUS FOR THE SAME.

If the dislocation has occurred within a few hours of the surgeon's seeing it, as a rule, it can be readily reduced; but if it has been neglected the reduction can only be accomplished by long continued and steady extension.

After reduction, the finger should be rolled with tape, surrounded and supported with pasteboard; the hand and forearm should be kept in a sling.

It is more difficult to reduce dislocations of the toes than the fingers.

DISLOCATIONS OF THE THUMB.

In dislocation of the first phalanx of the thumb, it will be found thrown back upon the metacarpal bone, where it forms a projection; the lower part of the metacarpal bone projects inward; the thumb is shortened and can neither be bent nor extended; the last phalanx is usually flexed.

Extension and counter-extension are the usual means employed to reduce this dislocation. Extension may be made by means of the clove hitch, secured over a wet cloth, and counter-extension with a strong cloth; the fold resting on the palm of the hand, and the ends crossed behind the wrist and brought around to the front of the forearm and held by an assistant. Should more powerful extension be required, it may be obtained by means of Charriere's forceps or Levis' apparatus. The method of Professor Crosby, which consists in pushing the phalanx back, until it stands perpendicularly on the metacarpal bone, frequently succeeds where other modes fail.

DISLOCATIONS OF THE HIP JOINT.

There are four dislocations of the thigh bone; viz., *upward on the dorsum of the ilium; downward into the thyroid foramen; backward* and *upward* into the ischiatic notch; and *forward* and *upward* on the body of the pubis.

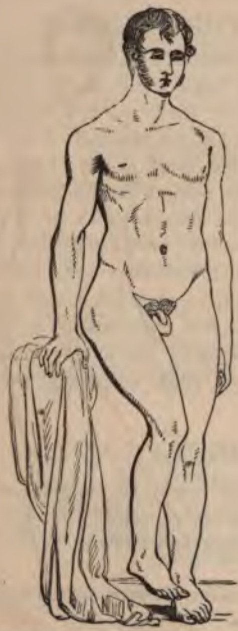
First. Upward, on the *dorsum of the ilium*, happens more frequently than any other dislocation of the hip joint.

The characteristic symptoms are, a difference in the length of the limb, a change of position inward, a diminution of motion, and flattening. The toes rest upon the tarsus of the opposite foot; the knee and foot are turned *inward;* the knee slightly advanced on the other; the limb an inch and a half to two inches and a half *shorter* than the other, and the legs cannot be separated.

Second. Dislocation downward, into the thyroid foramen. The dislocated limb is two inches longer than the other. In thin persons the head of the thigh bone can be felt on pressure. There is flattening of the hip, and the body is bent forward. The toes point to the ground; the foot is *turned outward* or *inward.*

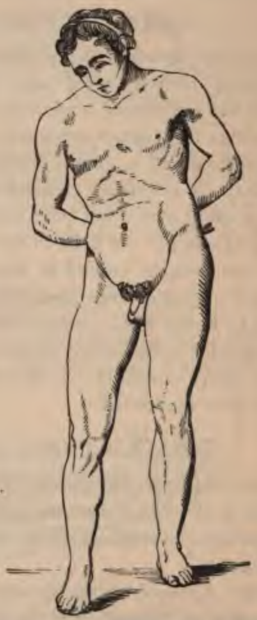
Third. Backward, into the sciatic notch. The head of the bone is placed on the pyriformis muscle. The limb is from half an inch to an inch *shorter* than the other; the toe rests on the ball of the great toe on the opposite foot. The knee and foot are turned *inward;* the toe, but not the heel, touches the ground when standing. Very little flexion and rotation can be made.

FIG. 14.



DISLOCATION UPWARD, ON THE DORSUM OF THE ILIUM.

FIG. 15.



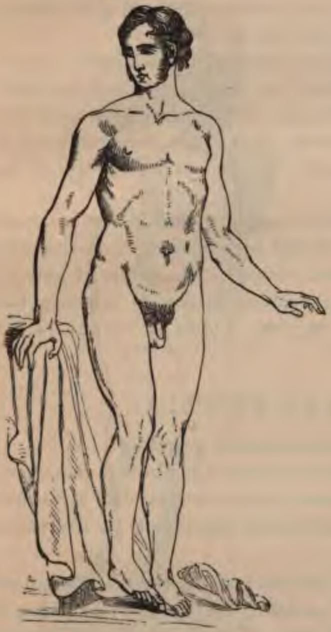
DISLOCATION DOWNWARD, INTO THE THYROID FORAMEN.

Fourth. Dislocation *on the pubes.* The limb is shorter than the other; the knee and foot are turned *outward*, and cannot be rotated inward; the head of the thigh bone readily felt on the pubes.

Treatment. These dislocations may be reduced by manipulation or by force; the former is the plan most in vogue.

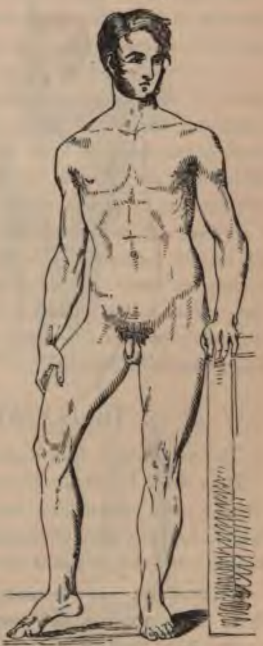
Dislocation Upward. The manœuvre by which a dislocated hip can be reduced consists in employing the length of the limb as a lever, and the trochanter as a fulcrum, by which the head may be got into such a position as to slip into its socket. The knee must be bent on the thigh, and the thigh on the pelvis; the surgeon then grasping the ankle with one hand and the knee with the other, causes the thigh to perform a circumduction movement toward abduction, finishing with a rotatory movement of the femoral axis, when the head of the bone will probably slip into its place.

FIG. 16.



DISLOCATION BACKWARD, INTO THE SCIATIC NOTCH.

FIG. 17.



DISLOCATION ON THE PUBES.

Professor Bigelow recommends that the thigh be first flexed with a little inward rotation, producing inversion of the toes, and then the thigh should be abducted, circumducted, and at the same time rotated outward. This has been described in the directions, "*lift up, bend out, roll out.*"

2. *Dislocation Downward.* Rotation inward of the flexed and slightly abducted thigh upon the fulcrum of the Y-shaped ligament.

3. *Dislocation Backward.* Bigelow reduces this dislocation by *circumduction* of the flexed thigh *inward*, so as to unlock the head of the femur, and then abducts and everts the limb with an upward jerk.

4. *Dislocation on the Pubes.* Flexion combined with adduction may be tried; if the pulleys are used the patient is to be laid on the sound side; extension should be made in a direction backward and outward, and counter extension in front of the patient; after it has been continued a little time, the head of the bone should be lifted over the edge of the acetabulum, by means of the napkin.

In these dislocations, if the method by manipulation fails, recourse must be had to force, which is usually effected by employing extension and counter-extension by means of traction, through the medium of pulleys, etc. For a full account of these different modes of applying the necessary counter-extending bands, etc., the student is referred to the larger works on Surgery.

DISLOCATIONS OF PATELLA.

The patella may be dislocated outward, upward or inward.

It is most frequently thrown on the *external* condyle, and there produces a great projection; the dislocation on the *inner* condyle is less frequent; in dislocation of the patella upward, the ligamentum patella is torn through and the patella is drawn up.

Treatment. In the reduction of the two first dislocations, the patient is to be placed in the recumbent position, the leg raised by lifting it at the heel, and then press on the edge of the bone that is furthest from the articulation. Evaporating lotions are to be employed when the reduction is accomplished, and a bandage should be worn for a few days.

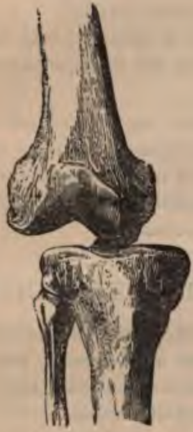
In dislocation of the patella upward, the bone is to be kept in contact with the ruptured ligament, and inflammation must be prevented by appropriate remedies, and then treated like a fracture of the patella.

DISLOCATIONS OF THE KNEE.

There are four dislocations of the knee :—

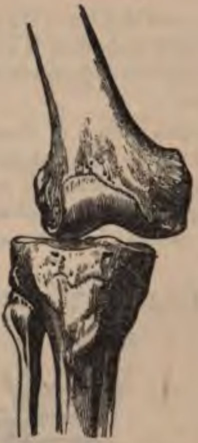
First dislocation is *inward;* the tibia projects on the inner side of the

FIG. 18.



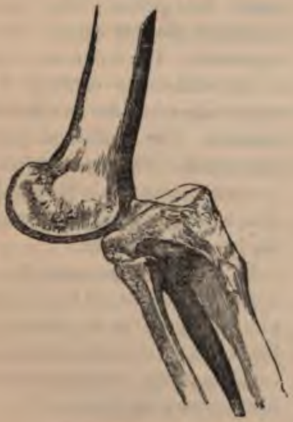
DISLOCATION INWARD.

FIG. 19.



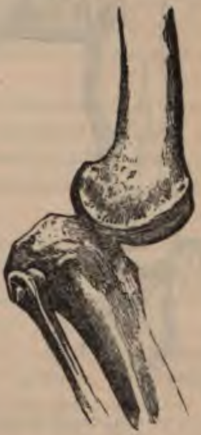
DISLOCATION OUTWARD.

FIG. 20.



DISLOCATION FORWARD.

FIG. 21.



DISLOCATION BACKWARD.

joint, and the condyle of the femur rests on the external semilunar cartilage.

The *second dislocation* is where the tibia is thrown on the *outer* side of the joint; the condyle of the femur being placed on the inner semilunar cartilage.

In the *third dislocation* the tibia is dislocated forward.

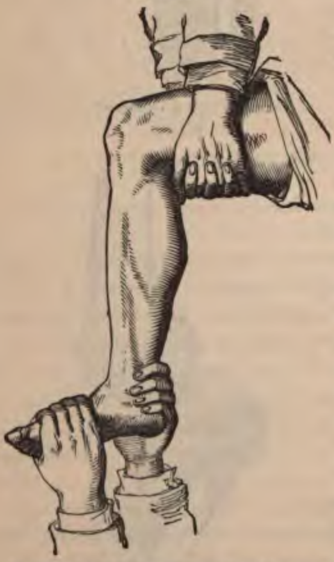
The *fourth dislocation* is when the tibia is dislocated backward.

The symptoms in these cases are obvious, and the injuries are all easily recognized.

Reduction. Each of these dislocations may be reduced by simple *extension*. There is great tendency to inflammation in these injuries, for which proper antiphlogistic remedies must be used; perfect rest must be enjoined; iced water, or lead water and laudanum, and such like measures must be resorted to; leeches applied, if necessary.

DISLOCATIONS OF THE ANKLE JOINT.

FIG. 22.



REDUCTION OF DISLOCATED ANKLE JOINT.

The usual dislocations at this joint are *inward*, *outward* and *forward*, but there may be a backward dislocation.

The dislocation *inward* is the most frequent; the foot is thrown *outward*, and its inner edge rests upon the ground; the internal malleolus projects against the integuments. The foot rotates easily.

The dislocation *outward* is the most dangerous; the foot is thrown *inward*. The malleolus projects very much. The toes and foot are pointed downward. This dislocation is accompanied by fracture of the internal malleolus.

In dislocation *forward*, the foot appears *shortened* and fixed, and the toes are pointed to the ground; the lower end of the tibia forms a hard swelling on the middle tarsus; the heel appears lengthened.

Treatment. To reduce the dislocation *inward*, place a patient on the mattress, bend the leg at right angles to the thigh, let an assistant grasp the foot and gradually draw it in a line with the leg. At the same time, fix the thigh and press the tibia downward. After reduction, support the foot with a many-tailed bandage, keep parts cool, etc.

For dislocation *outward*, reduce the dislocation as above directed, then lay the limb on the outer side, resting it in splints with foot pieces.

In dislocation *forward*, the treatment must be followed by rest. In five weeks the patient may be allowed to get up and use passive motion.

FRACTURES.

A **Fracture** is the division of a bone into one or more pieces, from violence.

A fracture is *simple* when there is no wound communicating with it; *compound* when there is such a wound; *transverse* when the line of fracture lies across the bone; *oblique* when it slopes; *longitudinal* when it is more or less parallel to the long axis; *comminuted* when broken in several fragments; *complicated* when there is laceration of an artery or joint, or other additional injury. A "*green stick*," or "*willow*" fracture is an incomplete fracture, in which some of the bony fibres have given way and the rest have bent, but have not broken. An *impacted* fracture is one in which one fragment is driven into and fixed in the other.

If the same bone is broken at two different places, or more than one bone is broken in the same limb, it is called a *multiple* fracture. If cracked only, without displacement or separation of periosteum, it is called a fissure.

The circumstances that render bones more liable than usual to be broken are atrophy arising from old age, or from prolonged disease of a limb; certain diseases, as fatty degeneration, rickets, *mollities ossium*, syphilis and cancer; original conformation; the bones of some people being more delicate than others.

Repair. The first result of a fracture is an effusion of blood between and around the broken ends; then follows a period of exudation, in which plastic lymph and leucocytes are effused; after this the lymph is developed first into fibroid tissue, interspersed with osteoid or cartilage cells, and then into bone. The periosteum, medullary membrane and surfaces of the broken bone are the principal agents in the production of the bone-forming cells. The time required for the completion of the union of broken bone varies, from four to ten weeks; being less in the young and healthy. The last stage in the process of repair is the absorption of superfluous bone, and the restoration of the cancelli and medullary cavities. This is completed in from six to twelve months.

The material by which fractures are first united is called *callus*.

The neck of the thigh bone, the olecranon, the acromion, coracoid and coronoid processes, the tuberosity of the os calcis and the patella do not, as a rule, unite by bone. The reasons given for this are, 1st, the great difficulty in keeping these broken surfaces in contact; 2d, in bones that enter into the formation of joints, contact is prevented by the displacement and separation caused by the abundant effusion of synovial fluid into the joint and between the broken surfaces of bone.

If considerable portions of the skull be removed, the gap is not entirely filled up.

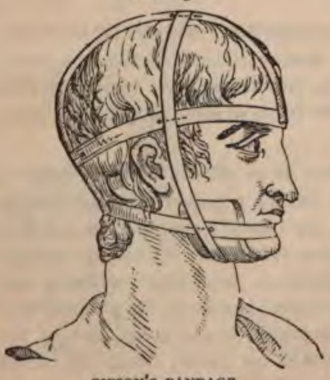
FRACTURES OF THE NOSE.

The nasal bones are, from their situation, much exposed to fracture. The fragments are frequently depressed, but may not be deranged.

Treatment. The displaced fractured portions should be adjusted as soon as possible; to replace them, a female catheter, a ring-handled forceps, or a metallic sound must be passed into the nostrils, and, using it as a lever, the fragments are pushed outward, while the parts are manipulated with the fingers of the left hand. As a rule, the fractured bones will retain their situation without further assistance; if they do not, they may be supported by the introduction of oiled lint.

FRACTURES OF THE JAW.

FIG. 23.



GIBSON'S BANDAGE.

Symptoms. Pain, swelling, crepitus, inability to use or move the jaw, and irregularity of the teeth. The anterior fragment is apt to be drawn downward and backward. On moving the chin, with the hand placed on the posterior fragment, crepitus will be felt; the gums are lacerated and bleeding, and the teeth, at point of fracture, loosened.

Treatment. It may be necessary to wire the teeth together, in order to retain the fragments in proper position. A piece of pasteboard or gutta-percha, cut into proper shape, and softened in boiling water, must be accurately fitted to the jaw. Then a four-tailed bandage must be applied, or a Barton or Gibson bandage, at the option of the surgeon.

During the cure the patient should be kept quiet and fed upon spoon diet, which should be continued until the bone is firmly united. Broths, soups, jellies, tea, milk, etc., are most eligible.

FRACTURES OF THE CLAVICLE.

A fracture of the **Clavicle** is usually caused by indirect violence, such as falls on the arm or shoulder; it is generally oblique in direction; it may be caused by direct violence, when it is commonly seated near the acromial extremity.

Symptoms. The shoulder sinks *downward*, *forward* and *inward;* the distance from the acromion to the sternum is less on the injured than on the sound side. In consequence of the sinking of the shoulder and the outer fragment, the sternal portion of the bone projects over the fractured extremity, and it may be distinctly felt by tracing the usual course of the clavicle with the finger.

Treatment. A fractured clavicle is easily reduced, but the difficulty is to retain the broken ends in exact apposition.

The arms and shoulders of the patient are to be firmly drawn backward by an assistant, when the fractured extremities come in apposition; the shoulders must be raised and supported in a direction *upward*, *backward* and *outward*. The parts are to be then covered with adhesive plaster, and a bandage is to be applied, to retain them in their reduced apposition.

Sayre's dressing and the apparatuses of Drs. Fox, Levis and Boyer, and the Velpeau bandage, are those most in vogue.

FRACTURES OF THE STERNUM.

The ordinary causes of fracture of the sternum are blows, kicks and falls. A fracture of this bone is rendered evident by the inequalities perceptible when the surface is examined by the fingers. It is also characterized by a depression or elevation of the broken pieces; crepitus and unusual mobility of the injured part in respiration. The breathing is difficult, and frequently accompanied with cough, spitting of blood, and inability to lie on the back.

Treatment. The application of compresses and an immovable bandage, to afford support to the chest and quietude to the intercostal muscles, are the indications.

In cases attended with great depression of the fractured bone, it may become necessary to elevate it.

FRACTURES OF THE RIBS

Are generally caused by direct violence, and are usually situated in the anterior half; they may, however, be caused by indirect violence, as when the chest is violently compressed.

Symptoms. Fixed lancinating pain, increased by inspiration, coughing and other motion. In stout persons, or where the fracture is near the spine, it may be difficult of detection.

Treatment. The indications are: 1st. *Diminish motion* of the ribs, by passing a broad flannel roller around the chest, so as to give support; the respiration being performed by the diaphragm. The arms should be confined to the side, to prevent motion of the scapula.

2d. To *prevent inflammation* of the chest, keep respiration easy, and relieve pain by rest in bed, purgatives and opiates, if necessary.

Emphysema is an occasional complication, which will be relieved by adapting a firm bandage over the seat of fracture.

FRACTURES OF THE SCAPULA.

The **Scapula** is so much covered with muscle, and its connections with the trunk allow so much yielding on the application of external force, that fractures of this bone are extremely uncommon. The injury may occur to its *body*, its *inferior angle*, its *neck*, to the *acromion* process, or the *coracoid* process. In fracture of the body of the bone the shoulder will be depressed and forced forward, and there will be marked irregularity between the ends of the fragments. Fracture of the *inferior angle* is marked by preternatural mobility, by displacement of the smaller fragment, and by acute pain at the seat of injury. In *fracture of the neck*, the acromion is unusually prominent, the head of the humerus is felt in the axilla, the shoulder is flattened, the limb is lengthened, the coracoid process is found below the clavicle, severe pain and numbness are experienced in the axilla, and distinct crepitation is perceived on rotating the arm upon the scapula. In fractures of the *acromion* and of the *coracoid*, the symptoms are somewhat similar to those presented by the fracture of the neck.

Treatment. When the *body* is broken, a broad roller must be passed round the trunk, over a large flat pad placed over the scapula, and a few turns made around the arm, so as to fix it to the side and prevent motion. Rest and quietude are required.

In *fracture of the neck* the shoulder must be supported by the sling and bandage that are used for fracture of the clavicle, but the pad should not be so thick, nor so large, and in addition a short sling should be used, going from the axillary pad on the injured side to the opposite shoulder. Opium, rest, leeches and purgatives may be necessary, for the contusion with which this fracture is accompanied.

In fracture of the *acromion* the bandages are to be so applied as to raise the elbow thoroughly, so that the head of the humerus may be lifted up against the acromion and keep its place. A pad must *not* be placed in the axilla, otherwise the broken part will be pushed too much outward.

When the *coracoid* process is fractured, the humerus must be brought forward and inward, so as to relax the coraco-brachialis, and must be confined to the trunk, with the forearm bent on the chest.

FRACTURES OF THE HUMERUS.

The **Humerus** may be fractured at any point.

Fracture of the Neck. Care must be taken not to confound this fracture with luxation of the bone downward and inward; in fracture of the neck, the shoulder retains its natural form; the acromion does not project and the depression is below the point of the shoulder; in dislocation there is a deep depression below the projection of the acromion, in the natural situation of the head of the humerus.

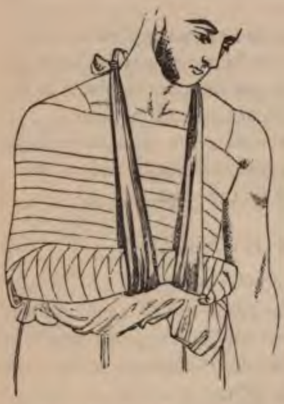
Treatment. To support the weight of the limb, and keep it firmly fixed to the side, are the most effectual means of maintaining apposition; for this purpose, a thin pad, a compress or a folded towel, should be placed in the axilla, which must be held in its place by a bandage or by adhesive strips; the arm is then brought to the side, the elbow somewhat forward. The arm must then be securely fastened to the chest with circular turns of the roller, and the forearm placed in a sling.

Fracture of the Shaft. The existence of this fracture is easily ascertained; the head of the bone being grasped with one hand and the elbow with the other, upon rotating the arm, no motion will be communicated from the lower to the upper portion, and crepitus will be distinguishable.

Treatment. Use a well padded internal angular splint, a cap of felt adjusted to the shoulder and extending down to within two inches of the elbow joint, to be secured by a well-fitted roller; the forearm placed in a sling. Professor Brinton does not advocate the bandaging of the forearm and arm before applying the splint; other authorities do.

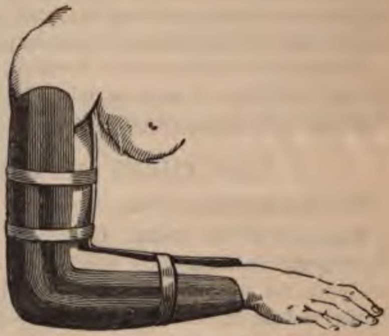
Fracture of the Condyles. When the condyles are obliquely broken off, just above the joint, the appearances are those of a dislocation of the radius and ulna backward; but in the case of fracture, the displacement recurs when the extension is remitted, and crepitus is generally perceptible when the forearm is rotated upon the humerus.

FIG. 24.



FRACTURE OF NECK OF HUMERUS.

FIG. 25.



DRESSING FOR FRACTURE OF SHAFT OF HUMERUS.

Treatment. The indications in these cases are to bend the arm, draw it forward so as to reduce the parts, and then apply a roller.

The best splint to be applied is an L-shaped anterior splint; that known as Hewson's is recommended.

FRACTURES OF THE FOREARM.

Fracture of the Olecranon.

Symptoms. Limb easily bent; but great pain and inability to straighten it; a hollow is felt at the back of the joint.

Treatment. The best way to treat this injury is with a straight, anterior splint, padding it thickly opposite the joint, so as to give a slight bend, securing the splint by broad straps of adhesive plaster, and a bandage.

Fracture of the coronoid process. Very rare.

Symptoms. Difficulty of bending elbow and dislocation of the ulna; the olecranon projecting backward.

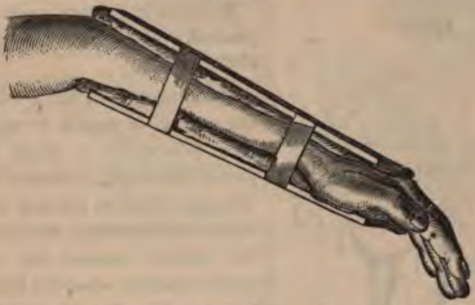
Treatment. The arm must be bandaged and kept at rest in the bent position. Union ligamentous.

Fracture of the Shafts of the Radius and Ulna. These bones may be both broken together, or they may be fractured singly. Easily recognized by the ordinary signs of fracture, especially crepitus, felt on fixing the upper end and rotating or moving the other.

Treatment. The indications are to prevent the fractured end of either bone from being pressed inward toward the interosseous space, and to prevent the upper fragment of the radius from being more supinated than the lower.

The elbow must be bent, and the forearm placed in a position intermediate between pronation and supination, the thumb pointing upward; one splint should be applied to the flexor side, from the inner condyle of the humerus to the root of the fingers, and another from the outer condyle to the back of the wrist. Both splints must be wide and well padded *along the middle*, so as to prevent the bones from being pressed together by the bandage.

FIG. 26.



FRACTURE OF THE RADIUS AND ULNA.

Fracture of the lower extremity of the Radius, from half an inch to an inch above the wrist, and transverse in its direction, is generally known as Colles' fracture; when the fracture is very oblique, extending from the articulation upward and backward, it is called Barton's fracture, from the name of the surgeon who first accurately described the injury.

Treatment. The splints of Dr. Bond and Dr. Levis, are those most commonly in use; they must be well padded and retained in position by a roller.

Fractures of the Carpus, etc. The bones of the carpus, when broken, are usually crushed by heavy bodies, or torn by violence; they are generally followed by severe and troublesome symptoms.

Fractures of the Metacarpal bones, or of the phalanges, are readily recognized.

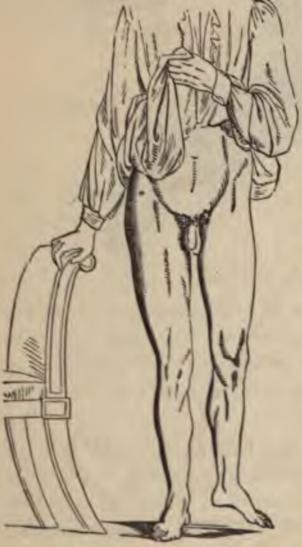
For fractures of the carpus and middle metacarpal bones, it is a good plan to make the patient grasp some soft substance and bind his hand over it; for fractures of the lateral metacarpal bones, it is well to support the hand on a well-padded splint.

If necessary, apply cooling lotions.

FRACTURES OF THE THIGH.

1. **Fracture of the neck of the Femur** within the capsule.

FIG. 27.



FRACTURE OF NECK OF FEMUR.

It is rare in persons under fifty, and generally occurs to old persons; especially women.

Symptoms. After a fall or blow, the patient is unable to stand; great pain, principally at upper and inner part of the thigh, increased by motion. The leg is shorter, the foot turned outward, rarely inward; the heel rests in the interval between the ankle and tendo-Achillis; when the limb is drawn to proper length and rotated, crepitus may be detected. When extension is discontinued, the limb again shortens. The limb may be freely moved by the surgeon, but the patient cannot move it from the bed.

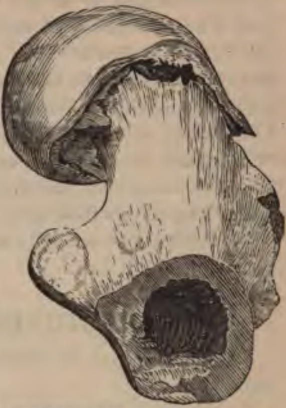
Dr. Allis, of the Jefferson Medical College Hospital staff, was the first to point out the fact that in all fractures situated above the insertion of the tensor vagina femoris, but especially in those occurring within the capsular ligament, the fascia lata is relaxed to such an extent as to make its want of tension of strong diagnostic value.

If the fibrous investment of the neck be not torn, or if the fracture be very oblique, so that the upper opposes the ascent of the lower fragment, there will be little or no shortening.

This fracture does not unite by bone, unless the broken surfaces are held closely together by the untorn periosteum or by impaction. Generally it does not unite at all.

2. **Fracture external to the capsular ligament** is caused by direct violence, and in consequence of other injuries around the great trochanter, or of the cervix being firmly impacted, the diagnosis is very difficult; there is no crepitus; the limb is shortened, but cannot be brought to its natural length by any justifiable amount of tension.

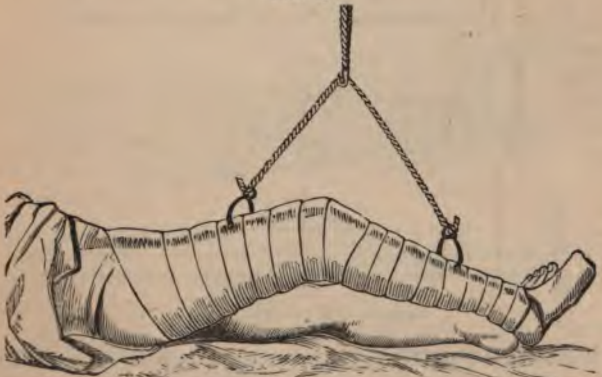
FIG. 28.



FRACTURE WITHIN THE CAPSULE.

3. **Fracture just below the Trochanters.** The upper fragment is tilted forward by the psoas magnus and iliacus.

FIG. 29.



N. R. SMITH'S ANTERIOR SPLINT.

4. Fracture of the Shaft of the Femur. The symptoms are plain and unmistakable.

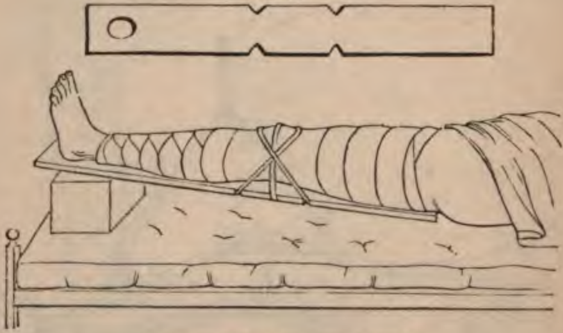
Treatment. *In fracture of the neck,* if the patient is old and feeble, he should be kept in bed for a fortnight, till pain and tenderness abate, with a heavy sand bag on each side of the limb, and a bag of shot or sand attached to the foot or ankle, which should be allowed to hang over the bed. He may then be allowed to sit on a high chair, and shortly begin the use of crutches. For cases of *fracture of the shaft* of the thigh bone, Liston's long splint, that of Desault, as modified by Physic, the splint of N. R. Smith, Hodgen's suspension apparatus, Levis' extending apparatus, Dr. Buck's apparatus, and that of Morton, which is in use in the Pennsylvania Hospital, are those most commended by the profession. The splint of N. R. Smith is especially adapted to cases where the upper third of the bone tends to tilt forward.

FRACTURES OF THE PATELLA.

The patella may be fractured longitudinally, but is usually broken transversely.

In longitudinal fracture, the treatment is to reduce the inflammation by leeches and evaporating lotions, and then apply a roller, and afterward a laced cap, with a strap to buckle above and below the knee ; the union, as a rule, will be ligamentous.

Fig. 30.



DRESSING FOR FRACTURED PATELLA.

Transverse Fracture. The upper fragment is drawn upward by the action of the muscles inserted into it, while the lower part remains stationary. The injury is known by the depression between the two portions of bone; the power of extending the limb is lost and the knee bends forward. The union of the fracture is generally by ligament.

The treatment indicated is to keep the leg steadily extended, the thigh, at the same time, flexed upon the pelvis, and the body kept in the semi-erect posture; a strong and well-padded tin or wire case may be used, reaching from the middle of the thigh to the corresponding point of the leg. Prof. Brinton prefers to use a posterior splint, reaching from the heel to the gluteal fold; a roller having been previously applied from the toes upward, and another from the groin downward. The fragments, having been brought in apposition, are confined by numerous adhesive strips, carried around the bone above and below the joint, and afterward connected by vertical and transverse pieces. Manning's splint; the splint of Agnew and of Hamilton, Malgaigne's hooks, Levis' hooks, and the hooks of Morton, all have their advocates.

For the first few days after the injury is incurred, antiphlogistic measures are to be employed, before any permanent treatment is to be resorted to.

FRACTURES OF THE LEG.

The two bones may be broken together, or they may be broken separately. The commonest fracture of the tibia is in the lower third; it is most frequently oblique, with the upper end directed downward and forward, so that it rides over the lower fragment; the fibula may give way at the same time, at a point nearly opposite. The tibia may also be broken transversely, at either the upper or lower half.

There are many methods of treatment: By the common splints; first reduce the fracture; apply the many-tailed bandage, and then use the shaped splints of Cline, supported by sand bags, or apply Macintyre's splint or Boyer's board and pillow dressing. The fracture box; the stiffened bandage, using the silicate of potash; paper and paste; plaster-of-Paris; or chalk and gum bandage, are in general use, and commended in turn.

SPRAINS.

A **Sprain** is a violent stretching of the ligaments, tendons or fascia surrounding a joint, with or without rupture of some of their fibres and blood vessels.

It usually happens from the sudden extension of the joint in the direction for which the muscles are unprepared; the most common situations of these accidents are the wrist or ankle.

The pain produced is instant and severe, frequently attended with faintness; the parts begin to swell immediately, and there is great tumefaction and ecchymosis, and subsequently weakness and stiffness of the part.

Treatment. The patient should at once go to bed, so as to ensure perfect rest; the part affected should be confined by a splint behind, held in place by a comfortably applied bandage, and the position of the limb should always be such as to relax the muscles. Warm fomentations or cold affusions, whichever are most agreeable to the patient, should be used; acetate of lead and opium should be applied through the medium of wet rags.

Should the pain and tumefaction increase, leeches should be freely applied, and if the patient is very plethoric, and the injury extensive, purgatives and general bleeding must be had recourse to.

Care should be taken not to use the part too early.

Should the disease become chronic, friction with moderate pressure should be used; stimulating liniments should be rubbed over the parts, which should be kept neatly bandaged; leeches and blisters should be resorted to, and good effects are often produced by pouring a continued stream of cold water over the part.

SYNOVITIS.

Synovitis, or acute inflammation of the synovial membrane, may be produced by local or constitutional causes, such as blows, strains, mechanical injuries, penetrating wounds, exposure to cold, syphilitic or gonorrhœal poisons, and gout.

The knee is the joint most frequently affected.

Symptoms. Severe aching pain in the joint, increased by motion, great swelling, redness of the surface, tenderness and fever, which is frequently violent.

The swelling, which is occasioned by a rapid effusion of fluid into the synovial cavity, is distinctive. There is evident fluctuation, if the joint is superficial. The shape of the joint is always altered.

When the knee is affected the patella is pushed forward, and there is great fullness on each side of it, and at the lower and front part of the thigh. The swelling, if at the elbow, is most distinct above and between the olecranon and the condyle; and in the hip there is general fullness of the surrounding parts and tenderness on pressure.

Treatment. Limb must be kept absolutely motionless. A splint must be applied, after being padded, so that it may be fastened some distance above and below the joint, and care must be taken that it does not touch the affected part.

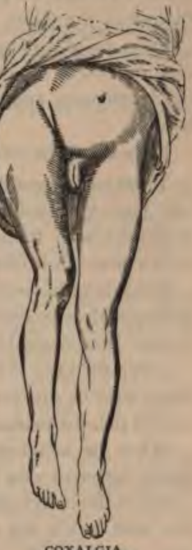
Leeches to the joint, cups in the neighborhood, evaporating lotions or hot fomentations. Calomel purgatives should be administered; and opiates, to relieve pain. When there is a tendency to the disease becoming chronic, iodide of potassium should be administered. And if the disease be connected with rheumatism, ammonia and potash should be prescribed. Where there is tendency to gout, colchicum with potash is to be employed. In syphilitic cases, mercury, in its different forms, is most to be relied upon.

COXALGIA, OR HIP JOINT DISEASE.

This disease is most frequent from the third to the seventh year.

The first circumstance which indicates disease of this joint is some degree of lameness and pain in the knee, with more or less weariness, some eversion of the foot and dragging of the leg. The motions of the joint are impeded; extension is performed with difficulty; the knee is bent; the heel on the diseased side scarcely rests on the ground; there is great difficulty experienced in the flexion of the joint.

FIG. 31.



COXALGIA.

To ascertain whether disease exists, the patient is placed on his back and examined, if the sides of the pelvis are equal; the pelvis will be lower on the diseased side. Then bend the knee on the abdomen; if there be disease of the hip joint, considerable pain will be occasioned. In rotating the joint pain will be excited. If the patient is turned on his face, the nates on the affected side will be found lower.

If the surgeon presses on the hip joint, either in front, over the psoas and iliacus, or behind the great trochanter, or jerks the femur against the acetabulum by a sharp tap on the trochanter major or heel, pain will be felt in the hip, and that in the knee will be greatly aggravated.

Abscesses are frequently formed in this disease, which take various directions; as a rule, their course is down the thigh, where they break; they may, however, occur in the upper part of the thigh, in the rectum or vagina.

The pain of complete extension of the joint, and the instinctive resistance of the patient to this position, when laid on a flat, hard bed, producing, when the knee is pressed straight, a sudden aching of the lumbar curve, is very characteristic of the disease, even in the earliest stages.

Treatment. The patient must be kept in perfect rest in the straight posture, by means of sand bags placed on each side of the limb; that on the outside reaching as far as the axilla.

Extension and counter-extension must be steadily kept up, in the same manner as in treatment of fractures of the lower extremities.

Dr. Buck's American stirrup may be used with advantage.

When the patient is in a condition to take exercise in the open air, the apparatus of Dr. Sayre answers all the indications.

ANKYLOSIS.

Ankylosis is an osseous or ligamentous union of the joint ends of a bone, impeding or preventing motion; it frequently follows injuries or disease of the joints.

False ankylosis depends on the thickening of the synovial membrane, or organization of bands of adhesion within and around the joint.

Ligamentous ankylosis is the union of two articular surfaces by fibrous tissue.

Bony ankylosis results when the fibrous tissue becomes ossified.

Treatment should not be attempted until the diseased action has ceased and parts returned to a quiescent condition. After this *passive motion*, combined with friction, must be resorted to. A screw fitted to a splint with a hinge in it may be used to gradually straighten the joint.

Forcible or immediate extension, by breaking up ligamentous adhesions, is frequently employed; and any tendons, fascia or muscular fibres whose rigidity is an obstacle, may be divided by subcutaneous section.

When the knee is affected, the hamstring muscles and portions of the fascia may be divided; if the elbow, the biceps may be cut. The joint should then be extended by main force.

When the ankylosis is bony and the limb fixed in position, a subcutaneous operation may be performed.

When the ankylosis is bony and extensive, the remedy is to cut through the bone, or cut out a wedge-shaped portion, and then employ sufficient motion to establish a false joint.

CARIES.

Caries is a disease of the bones supposed to be analogous to ulceration of the soft parts.

Bones of a spongy texture are more frequently attacked by caries than such as are compact; hence the vertebræ, astragalus and other bones of the tarsus, those of the carpus, the sternum, the pelvis, and the heads of the long bones, are often affected, and the bones of young persons are more frequently the seat of caries than those of old subjects.

On examination, the bone is soft and dark red; its cells filled with reddish, serous, glairy fluid, or with soft granulations of feeble vitality. After a time suppuration occurs between it and the surface, the abscess breaks, and the carious portion of the bone, already softened, gradually perishes in minute particles, which are thrown off and discharged with the pus. The bone appears enlarged, and one or more sinuses open, at points that are soft, red and sunken.

The predisposing cause is some constitutional disorder, scrofula or syphilis. The exciting cause may be a blow or injury.

Treatment. Rectify constitutional disorder and remove local disease. Change of air, tonics, sea air, sea bathing, and the usual remedies employed in scrofula and syphilis.

Locally, the best treatment is to freely expose and remove the diseased portion of bone.

NECROSIS.

Necrosis is the death or mortification of a bone, and is applied to cases in which part of the shaft of a bone dies, from injury or violent inflammation. The term exfoliation signifies necrosis of a thin, superficial layer, which is not encased in new bone.

This disease most frequently attacks bones of compact tissue; the shafts of the femur and tibia are often the seat of this affection. Necrosis of the lower jaw frequently results from the inhalation of the fumes of phosphorus by persons employed in lucifer match manufactories; this causes inflammation and thickening of the periosteum, followed by abscess, resulting in necrosis of a portion of the bone.

The bone, in necrosis, dies, from obstruction of its circulation; but the periosteum, with the articular extremities, its medullary membrane, and other contiguous parts, speedily ossify and form a new shell around the dead portion, and adhere to the living bone above and below.

Symptoms. After acute inflammation, the bone remains permanently swelled, and the apertures made for the discharge of matter remain as sinuses; these sinous apertures in the skin usually correspond to holes in the shell of the new bone, and by passing a probe through them, the sequestrum may be felt, loose, in the interior.

Treatment. The indication is to remove the sequestrum. As soon as it is sufficiently loose it should be removed. If small, it may be grasped and removed with a forceps; if larger, a free incision should be made, so as to expose the surface of the bone, and it should be made at a point where the *cloacæ* exist, or where the bone is nearest the skin. The new shell must be perforated with either a Hey's saw, or with a chisel or gouge, and the sequestrum drawn out.

RICKETS, OR RACHITIS.

This is a peculiar disease, produced by a morbid condition of the whole body, and generally arising from hereditary taint, defective hygienic conditions, want of fresh air and light. It is frequently attended with scrofulous disease. Its leading characteristic is imperfect development, atrophy and distortion of some of the bones of the body; these are soft, and consist of a sort of semi-cartilaginous tissue, which will bend without breaking. The articular portions are often disproportionately large. The shafts are unable to support the weight of the body, without bending.

The physiognomy and general appearance are very peculiar; the stature is stunted, the head large, and the forehead protuberant. The face is small and triangular, chin sharp, teeth projecting, chest prominent and narrow, the spine variously curved; the pelvis small; the promontory of the sacrum and acetabulum pressed together; the limbs crooked, their natural curves increased.

Treatment. Invigorate the constitution, if possible.

Cod-liver oil, iron, compound syrup of the hypophosphite of lime, soda, potash and iron, and such other remedies as are usually prescribed for scrofula.

Diet should be generous and nutritious, animal food, milk, eggs, etc., etc. Sunlight and pure air.

If possible, use some mechanical contrivance to straighten the bones, and keep them so until they are strong enough to bear the weight of the body.

DISEASES OF THE SPINE.

Psoas and Lumbar Abscess. These are chronic collections of matter, which form in the cellular substance of the loins, behind the peritoneum, and descend in the course of the psoas muscle; if the disease forms on the side of the vertebræ, instead of the fore part, it is termed lumbar abscess.

At the beginning there is little or no pain, no inflammation, nor is there febrile disturbance; but previous to the appearance of any other symptom the patient has an unaccountable feeling of weakness across the loins, accompanied by pains, usually giving no indication of the seat of the disease, and likely to be regarded as rheumatic.

The pus is formed slowly and imperceptibly, and occasions, at first, no manifest swelling, nor fluctuation.

When the matter has collected, it spreads until it reaches the origin of the psoas muscle. The abscess proceeds as far as the tendon of the muscle by Poupart's ligament, when its further progress is apt to be arrested. When it has attained considerable magnitude it passes under Poupart's ligament, between the femoral vein and the symphysis pubis.

The diagnosis is difficult when the abscess is unattended by an external tumor.

The swelling takes place in various situations and assumes different aspects; it may appear beneath the femoral fascia, or it may descend as far as the knee and form a prominent swelling; sometimes it will make its way downward into the pelvis and occasion a swelling in the neighborhood of the anus, or it may appear in the vicinity of the vertebræ, or again, it may make its way through the abdominal muscles.

This disease arises generally from cold, strains, or falls, and from general debility, and not unfrequently from spinal affections.

Treatment. The indications are to procure absorption of the matter, if possible, and keep up the patient's strength by judicious tonic treatment. If the tumor enlarges and threatens to burst, the contents of the sac should be removed by the aspirator, taking great care not to allow air to enter, and afterward closing the wound. When the fluid is escaping the sides of the abscess must be brought together by careful bandaging. This operation may be repeated in ten days or two weeks, as the sac becomes full, and after being resorted to several times, with proper constitutional and local treatment, the abscess will gradually contract, and may become entirely obliterated.

The general treatment must be tonic and alterative.

Lateral Curvature of the Spine arises from debility of the ligaments and muscles, and is common among girls between the ages of ten and sixteen years.

There is a perceptible *growing out of* one shoulder, or an elevation of one shoulder, more frequently the right; the spine is found, on examination, to be curved like an S and twisted on its long axis.

This deformity is usually produced by occupations that tax one side of the body more than the other, especially the habit of *standing at ease* on the right leg; it may also be produced by one-sided postures in sitting or writing. This curvature is frequently produced by disease of the bones, as in rickets.

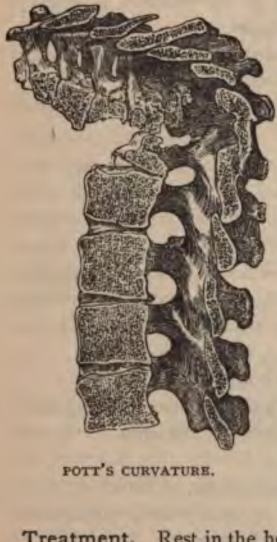
Treatment. The general health of the patient is the first thing to be attended to; change of air, good diet, the different preparations of iron, bathing the body with salt and water every morning, are the remedies to be resorted to.

The patient should be kept out of doors as much as possible, and should be directed to take foot or horse exercise, but when not moving he should be required to lie down as much as possible, and not to sit upright. Mechanical support may be advisable in severe cases.

Angular Curvature, known as *Pott's Curvature,* is produced by softening and absorption of the intervertebral substances, and caries of the bodies of the vertebræ.

Symptoms. This disease usually begins with weakness, coldness and numbness of the legs, and incapability of making exertion; these symptoms are followed by twitchings and spasms of the legs, and sometimes palsy. In adults there is generally a dull, aching pain, aggravated by motion, and tenderness on pressure. If the patient slips when walking, he experiences great distress; this is one of the symptoms in children by which attention is called to their condition. If the disease is situated in the dorsal vertebræ there will be tightness of the chest and difficulty of breathing; if the cervical vertebræ are affected one or both arms may be palsied, and there will be difficulty in supporting the head. As the disease advances, the trunk becomes curved forward, and the spinous processes of the diseased vertebræ project backward. Abscess may form; there is great constitutional derangement, with hectic.

FIG. 32.



POTT'S CURVATURE.

Treatment. Rest in the horizontal posture is absolutely necessary. A bandage containing strips of whalebone, and reaching from the head to the hips, may be employed to keep the trunk at rest. Issues on each side of the spinous process of the diseased vertebræ may be used.

The constitutional treatment should be the same as that recommended for angular curvature, and for scrofulous cases generally.

Efficient mechanical support during convalescence is absolutely necessary; the plaster jacket of Dr. Sayre, of New York, is in general use, and the one most to be recommended.

AMPUTATIONS.

AMPUTATION AT THE HIP JOINT.

This operation is requisite in cases of cancerous or hopeless disease of the femur, and in those injuries in which the upper extremity of the thigh bone is smashed and the soft parts so much damaged that it is useless to attempt excision.

It is generally performed by flaps, either antero-posterior or lateral. The femoral artery should be compressed and seized as soon as cut, by the hand of an assistant following the knife.

The *arteries* divided in this operation are the *muscular* and *femoral*, lying close together inside and in front of the bone.

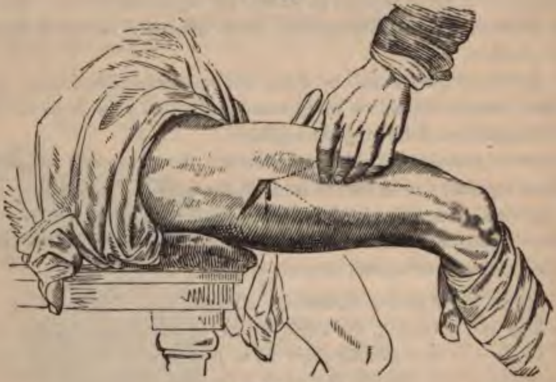
The *internal circumflex* is also divided, and also the *external circumflex*. The great sciatic nerve and an accompanying branch of the ischiatic artery lie in the posterior flap, near its centre.

Operation by Antero-Posterior Flaps. The thigh having been slightly bent and abducted, the knife is entered at the outside, at the junction of the upper and middle third of a line drawn from the anterior superior spine of the ilium to the great trochanter, and carried obliquely inward and downward immediately in front of and touching the joint, and finally brought out about two inches below the tuberosity of the ischium. A large anterior flap is made, about six or seven inches long, which is at once firmly grasped, to prevent hemorrhage, and drawn upward. The anterior part of the capsular ligament already laid bare is then divided, together with the cotyloid ligament; the head of the bone is dislocated by rotating the limb outward and extending it backward; the *ligamentum teres* cut through and the disarticulation completed. The knife is then carried through the joint, over the trochanter, and the posterior flap made somewhat small and thin. Sponges are stuffed into the wound by assistants, to restrain the hemorrhage, until the vessels are secured by ligatures; sutures, plasters and bandaging, complete the operation.

AMPUTATION OF THE THIGH.

Circular Method. The surgeon stands at the outer side. One assistant must hold the limb, and another must draw up the skin as high as possible. Then the surgeon, grasping firmly the knife, with the point upward and the edge toward his arm, commences by passing his arm under the limb, laying the edge of the knife over it, and makes a transverse incision at one sweep, completely around the limb, through the skin and fat, down to the fascia. The knife cuts from heel to point. The assistant now draws upon the skin and folds it back like a coat cuff; and then the knife, being put close to the edge of the retracted folded skin, is made to divide the superficial vessels, and then cut everything down to the bone by a clear sweep. Then separate the muscles upward from the bone, for an inch or two, with the point of a knife, and divide the periosteum. The soft parts are next to be drawn up from the bone by the *retractor*, and lastly, the bone is to be divided by the saw. Should the bone be splintered, the projecting parts must be removed by the bone forceps. The femoral artery must now be secured, its orifice being grasped and slightly drawn out by forceps; and afterwards any large branches that appear in the muscular interstices. Then all compression should cease, so that arteries that are likely to bleed should do so. When the bleeding has finally ceased, the edges of the wound should be adapted with sutures, and a few long slips of plaster and a light bandage passed around the stump. The

Fig. 33.



FLAP OPERATION.

arteries divided are the *femoral*, the *profunda*, and the descending branches of the external circumflex.

Flap Operation. The operator may stand on either side of the limb. In amputating the right thigh, he stands on the outer side and raises the flap with the left hand, and this gives him the power of grasping the main artery, with the flap, with that hand, and thus assisting in restraining hemorrhage. The flaps may be made from the *inner* and *outer*, or from the *anterior* and *posterior* aspects of the limb. He then passes his knife horizontally through it till its point touches the bone, over which he passes the point, pushes it through the other side of the limb as far back as possible. He then carries the knife along, close to the bone, for about three inches, and finally cuts out forward, so as to make the anterior flap spade-like, without corners. The knife is again entered a little below the top of the first incision, passed behind the bone, brought out at the wound on the other side, and cuts the posterior flap. Each of the flaps should be rather longer than the semi-diameter of the limb at the point operated on. Both flaps are now drawn back, the knife swept round the bone, to divide any remaining muscular fibres, and the bone sawn through.

AMPUTATION AT THE KNEE-JOINT.

Long Posterior Flap. (*Syme's Operation.*) A semi-circular incision is made through the skin and fascia, over the patella; next the knife is thrust horizontally across, immediately behind the joint, and is made to cut a long flap from the calf of the leg; next, the anterior flap being lifted up, the extensor muscles are severed from the upper border of the patella; the remaining soft parts are divided, and the femur sawn through the condyles, immediately above the joint.

Long Anterior Flap Operation. An anterior flap may be made, including the patella, by a semi-circular incision through the tissues in front, below the patella, from the posterior part of one condyle of the femur to the other. Then the *ligamentum patella* is cut through, the patella lifted with the anterior flap; the joint opened by cutting through the lateral and crucial ligaments, and a posterior flap cut from the calf.

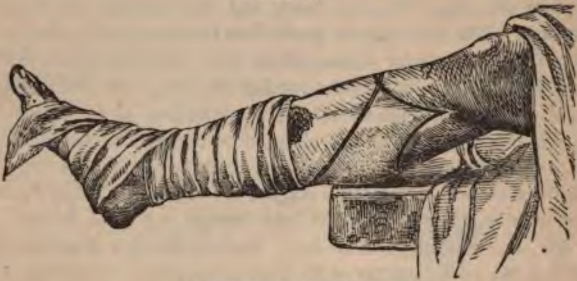
The inter-articular cartilages should be removed, and the surface of the patella and the femur, only if diseased. Some surgeons bring down the patella over the femur; others remove it.

The arteries divided are the *anterior and posterior tibial*, *sural* and *articular* branches.

AMPUTATION OF THE LEG.

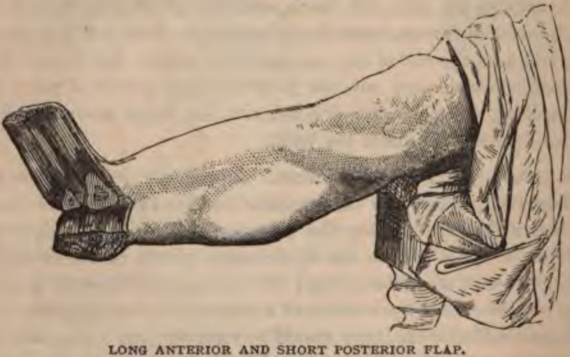
Double-flap Method, at the upper fourth of the leg. A stout bistoury, with blades four or five inches long, and a broad saw, are the cutting instruments required. The flaps are made of integuments only, by cutting from the surface without transfixion. The point of the knife is entered at the side, about two inches below the tibial tubercle, and carried across the front of the leg, describing an anterior curved flap, rather longer than, and of the exact width of, the half diameter of the limb. This is dissected up close to the bones and deep fascia. A similar flap is made on the posterior aspect, and the integuments and fascia composing it are raised from the muscles. The latter, with the large vessels and nerves, are then

FIG. 34.



AMPUTATION OF THE LEG.

FIG. 35.



LONG ANTERIOR AND SHORT POSTERIOR FLAP.

divided transversely, direct to the bone. The point of the knife must be used to divide the intervening structures. The bones are then divided equally across.

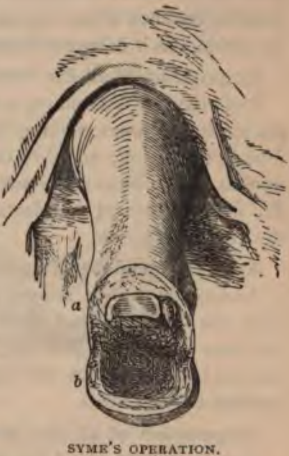
The *anterior tibial artery* is often divided as it passes between the bones to the front of the leg, and it may be difficult to get it separated from the surrounding ligamentous structures.

Single-flap Operation. The operator places the heel of the knife on the side of the limb furthest from him, then draws it across the front of the limb, cutting a semi-lunar flap of skin; when its point arrives at the opposite side, it is made to transfix the limb, and then the posterior flap is cut. Care must be taken not to get the knife between the bones when making the flap by transfixion. The muscles and ligamentous structures which are between the bones are then divided by the point of the knife. The fleshy mass of the gastrocnemius may require to be cut out, to make the posterior flap thinner.

AMPUTATION AT THE ANKLE JOINT.

Syme's Operation. Find the tip of the external malleolus, and then mark a point nearly opposite to it on the inner side of the ankle. This is about half an inch below and behind the internal malleolus; these points are joined by two incisions, one passing vertically under the sole of the foot and the other over the dorsum, so as to make an angle of 120° with the first. The first incision should be inclined backward rather than forward, so that the lower flap may be very short; the next step is to dissect the lower flap from the os calcis. When this is done the short upper flap is dissected from the dorsum. The foot is then forcibly extended, the ankle joint opened and the foot removed. The malleoli are then sawn off and the flaps brought together with sutures.

FIG. 36.



SYME'S OPERATION.

Pirigoff's Operation. Instead of dissecting out the entire os calcis, Pirigoff removes the anterior part only of the bone, which supports the astragalus.

In this amputation the first incision is begun close in front of the malleolus and carried straight down to and transversely across the sole of the foot, then obliquely upward and forward to the front of the inner malleolus, dividing everything down to the bone. The incision is then brought obliquely forward on the inner side, so as to cut the *posterior tibial* artery before its division into its *plantar* branches. The ends of this incision are connected by a semilunar one across it into the ankle joint. Then the lateral ligaments are divided and the posterior part of the capsule; with a narrow saw the os calcis is now cut obliquely from behind forward and downward. Then the malleoli are sawn off, with a thin slice of the tibia, if diseased. Lastly, the cut surface of the os calcis is brought into contact with that part of the tibia, and the wound is united with sutures.

AMPUTATIONS OF THE FOOT.

Amputations of the Toes at any of their joints is performed in precisely the same manner as amputations of the fingers. In removing a single toe from its metatarsal bone, the surgeon should take care to ascertain the exact situation of the joint, which lies rather deeply and much further back from the prominent knuckle of the toe than is at first sight apparent. If possible the head of the metatarsal bone should not be removed, if it can be avoided, as it is important to preserve the breadth of the foot.

Amputation of all the Toes at their Metatarsal Joints.

Performed by first making a transverse incision along the dorsal aspect of the metatarsal bones, dividing the tendons and lateral ligaments of each joint in succession; and then the phalanges being dislocated upward, the knife is placed beneath the metatarsal extremities and made to cut out a flap from the skin on the plantar surface, sufficient to cover the heads of the metatarsal bones.

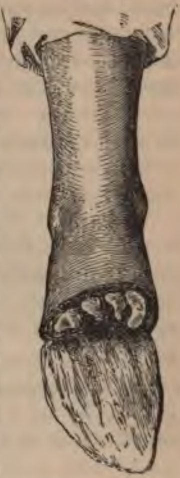
Amputation of the Metatarsal Bone of the Great Toe.

An incision with a scalpel is carried along the dorsum down to the bone and around the root of the toe. Then the knife is kept as close to the bone as possible, dissecting it out from the surrounding parts. Then the bone is removed at the metatarso-cuneiform joint, by division of the tendons and ligaments.

Amputation of all the Metatarsal Bones (Hey's operation).

The exact situation of the articulation of the great toe to the *inner cuneiform* bone being ascertained, a semilunar incision with the convexity forward is made through the tegumentary structures across the instep, from a *point just* in front of the aforesaid articulation to the outside of the tuberosity of the fifth metatarsal bone. This flap is turned back and the bistoury is first to be passed straight across the tendons and vessels, so as to cut them a little shorter than the integuments, and then around behind the projection of the fifth metatarsal bone, so as to divide the external ligaments which connect it with the cuboid. The dorsal ligaments are next cut through, the bones being at the same time well depressed. The third and fourth are to be disarticulated in a similar manner. The first metatarsal is next attacked, and lastly the second, the extremity of which, being locked in between the cuneiforms, will be more difficult to dislodge. When all the five bones are disarticulated, the surgeon completes the division of their plantar ligaments and separates the textures which adhere to them with the point of the knife, and then, the foot being placed horizontally, he puts the blade under the five bones and carries it forward along their inferior surface as far as the root of the toes, so as to form a sufficient flap (Fig. 37).

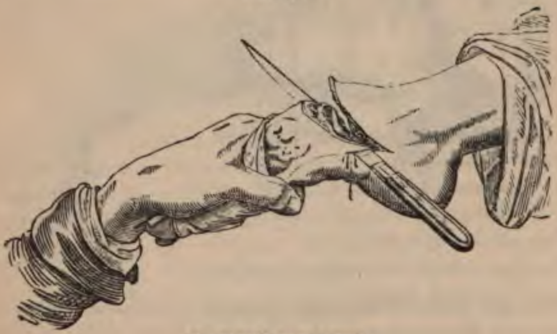
FIG. 37.



HEY'S OPERATION.

Amputation through the Tarsus (Chopart's operation). To remove the navicular and cuboid bones, with all parts in front of them.

FIG. 38.



CHOPART'S OPERATION.

In the first place, the articulation of the *cuboid* with the *os calcis*, and that of the *scaphoid* with the *astragalus*, must be sought for, and a semilunar incision must be made across the dorsum from one to the other, as in the foregoing operation. The flap of the skin being turned back, the internal and dorsal ligaments that connect the *scaphoid* to the *astragalus* are to be divided with the point of the bistoury. The ligaments connecting the *os calcis* and *cuboid* are next divided, and lastly a flap is taken from the sole of the foot. If the heel is drawn backward it may become necessary to divide the tendo-Achillis.

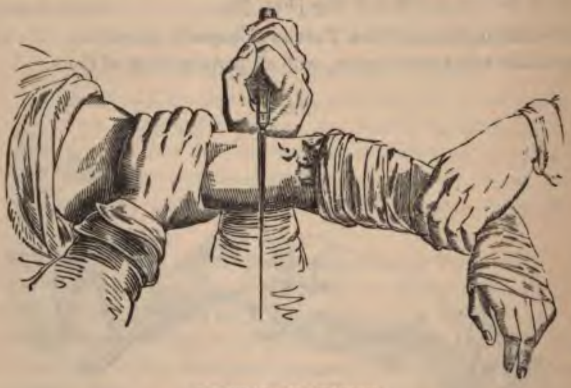
In these amputations the *dorsal artery* of the foot, and the external and internal plantar branches usually require ligature.

AMPUTATION OF THE ARM.

In amputations of the upper extremity the flow of blood may be sufficiently controlled by digital compression of the artery above the clavicle, or in the arm against the humerus. Or the tourniquet or Esmarch's bandage may be applied.

1. Circular Amputation. The arm being held out, and an assistant drawing up the skin, one circular incision is made through the integuments, which being forcibly retracted and detached from the deeper structures and doubled back to the extent of two inches, another is made to the bone. The subsequent steps are precisely similar to those described in amputation of the thigh.

FIG. 39.



CIRCULAR AMPUTATION.

2. Antero-posterior Flaps. The knife is extended at one side and *carried down to the* bone, turned over it, brought out to a point opposite and then made to cut a neat rounded anterior flap, three inches long. The knife is next carried behind the bone, to make a posterior flap of equal length, and is lastly swept round the bone to divide any remaining fibres with the periosteum; the vessels are cut when the posterior flap is being formed. The division of the bone, ligature of the arteries and treatment of the stump as heretofore.

Besides the *brachial artery*, the *superior profunda* and the *inferior profunda* require ligatures.

AMPUTATION OF THE SHOULDER JOINT.

The Flap Method. The patient is placed on a firm table, with the arm well raised and projecting beyond its edge; the subclavian artery being compressed, the operator enters a long, narrow, straight bistoury at the anterior margin of the deltoid muscle, if it be the right arm, an inch below the acromion. From this point he thrusts it through the muscle, across the outside of the joint, and brings it out at the posterior margin of the axilla.

If the left arm is operated on, the knife must be entered at the posterior margin of the axilla, and brought out at the anterior margin of the *deltoid*. Then, by cutting downward and outward, the external flap is made. The arm is then brought down to the side and forcibly adducted; the origins of the *biceps* and *triceps* and the insertions of the *infra* and *supra* spinatus are cut through and the joint laid open. Finally, the blade of the knife, being passed through the joint and placed on the inner side of the head of the bone, is made to cut an inner flap of the same shape, but rather shorter than the outer one.

AMPUTATION OF THE ELBOW JOINT

Is performed by passing a knife through the muscles in front of the joint and cutting upward and forward, so as to make a flap from the forearm. Then the operator makes a transverse incision across the olecranon and down to the bone behind the joint. He next cuts through the external lateral ligament and enters the joint between the head of the radius and external condyle, then divides the internal lateral ligament, and lastly saws through the olecranon, the apex of which, attached to the triceps, may be left on the stump, or afterward dissected out.

AMPUTATION OF THE FOREARM.

Always perform this operation as near the wrist as possible.

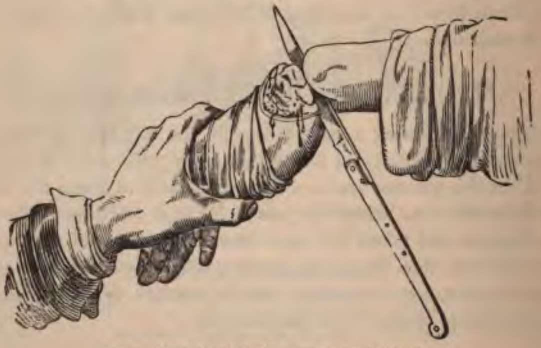
1. **Circular.** The limb being supported with the thumb uppermost and an assistant drawing up the skin, a circular incision is made through it, down to the fascia. When the integument is retracted and folded back about an inch, the muscles and tendons are divided by a second circular incision; the interosseous parts and the remaining fibres are next cut through; the bones are then sawn through together and of equal length, and projecting tendons trimmed off. The *radial*, *ulnar* and one or two *interosseous* arteries require ligatures.

2. **Flaps.** The limb being placed in a state of pronation, the surgeon makes a flap from the extensor side by transfixion; he then transfixes the flexor side, and makes the other flap; the flap from the extensor side should be made as broad as possible, by keeping the point well backward as it passes across the ulna, and at the same time drawing the parts well forward. The interosseous parts are then divided, the flesh drawn upward, the bones sawn through, and the tendons trimmed off.

AMPUTATION OF THE WRIST.

1. **Circular.** The skin being pulled back, a circular incision is made a little below the level of the line that separates the forearm from the palm of the hand. The integument must be turned back as far as the line of the radio-carpal joint. The external lateral ligament is then cut through,

FIG. 40.



FLAP AMPUTATION OF THE WRIST JOINT.

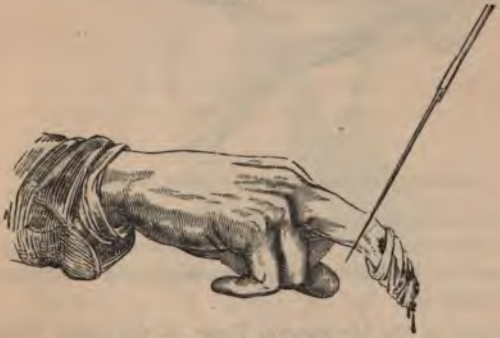
and the knife carried across the joint to divide the remaining attachments. The styloid processes of the radius and ulna should be removed with the cutting forceps, the tendons trimmed and the integuments brought together with sutures.

2. **Flaps.** A semilunar incision is made across the back of the wrist, its extremities being at the styloid processes, and its centre reaching down as far as the second row of carpal bones. Dissect up the flap of integument and fascia, flex the hand, and divide the extensor tendons across, opposite to the joint. The joint being opened behind, and the lateral ligaments cut through, and the knife being placed between the carpus and forearm, is made to cut out a flap from the anterior surface of the palm. (See Fig. 40.)

AMPUTATIONS OF THE HAND.

Amputations of the fingers or thumb at their distal joints are performed by the operator holding the phalanx firmly between the finger and thumb and bending it, so as to give prominence to the head of the middle phalanx. He then makes, with a scalpel, a straight incision across the dorsal skin, over the head of the middle phalanx, along the distal groove of the knuckle, so as to cut into the joint deeply enough to divide the lateral ligament. The knife is carried through the joint, and cuts a flap from the palmar surface of the last phalanx, sufficient to cover the head of the bone.

FIG. 41.

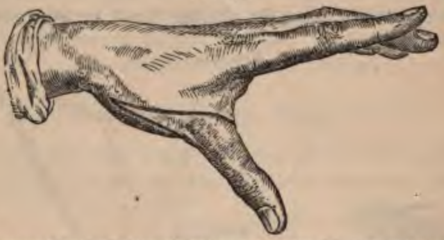


AMPUTATION OF THE FINGER.

Amputation of the Finger at the Metacarpal Joint. Seize the finger firmly with the left hand; make an incision on one side of the prominence of the knuckle, a quarter of an inch above the joint, and carry it around the side of the joint to the web on the palmar aspect of the opposite side. The extensor tendon must now be cut through, and the point of the bistoury passed into the joint and made to divide its ligaments. Turn the head of the bone out, so that the bistoury, being placed behind it, may cut through the remaining attachments, and make another side flap.

Amputation of the Metacarpal Bone of the Thumb. *By anterior flap operation.* Hold the thumb out; insert the bistoury near the metacarpo-phalangeal joint; its point is thrust between the bone and the muscles of the ball of the thumb, and as close to the bone as possible, and brought out just above the articulation with the trapezium. The bistoury is then made to cut its way outward, and the point of the knife is carried from the upper end along the bone, and round the metacarpo-phalangeal joint, to meet the other incision. The bone is disarticulated by being forcibly abducted, and the ligaments on the inner side of the metacarpo-trapezial joint cut through first.

FIG. 42.



AMPUTATION OF THE METACARPAL BONE OF THE THUMB.

Amputation of the Metacarpal Bone of the Little Finger. An incision is made along the ulnar border of the dorsum of the bone, and carried round to encircle obliquely the root of the little finger. The skin and flesh are dissected off, as closely as possible to the bone, and the bone is disarticulated, by the point of the knife, from the unciform, while the ligaments are stretched to their utmost by extreme abduction.

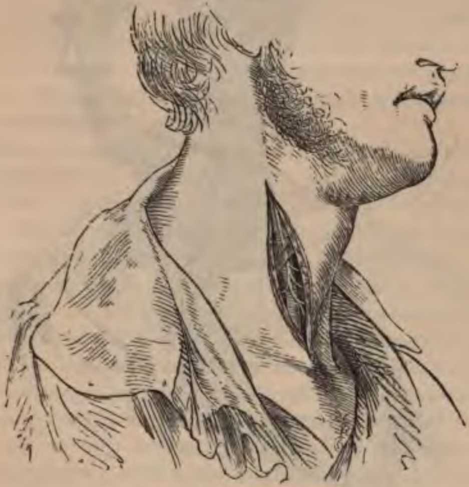
LIGATION OF ARTERIES.

The Common Carotid Artery, on each side, lies upon the *longus colli* muscle, and is contained in a dense areolar sheath, which also includes the internal jugular vein on its outer side, and the pneumogastric nerve between; in front of the sheath is the *descendens noni* nerve; behind the sheath lie the sympathetic and cardiac nerves. At the lower part, the inferior thyroid artery and recurrent laryngeal nerve cross behind it, toward the larynx.

The left common carotid arises from the arch of the aorta, and rests first on the side of the trachea, œsophagus and thoracic duct; the left jugular vein lies rather in front of the carotid, as it joins the left brachio-cephalic vein.

The right carotid arises from the *arteria innominata*, behind the sterno-clavicular articulation, and ascends more perpendicularly. Both arteries divide into internal and external carotids opposite the upper border of the thyroid cartilage.

FIG. 43.

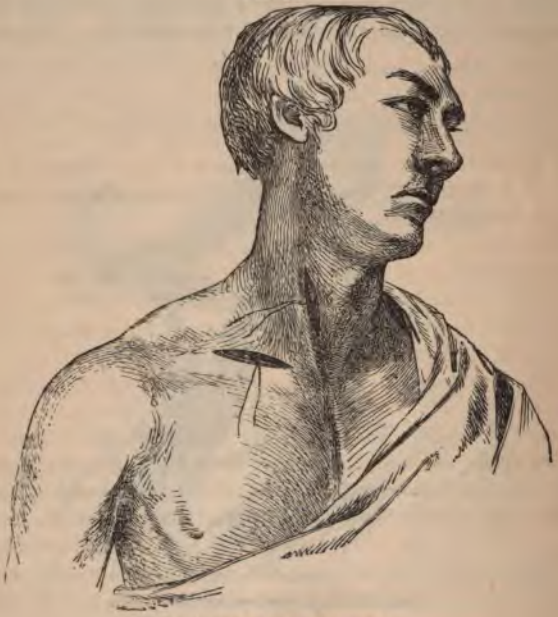


RELATIONS OF COMMON CAROTID.

At the lower two-thirds each artery is covered by the sterno-mastoid, sterno-hyoid and sterno-thyroid muscles, and is crossed by the omo-hyoid, opposite the cricoid cartilage. At the upper part of its course the artery is covered only with skin, fascia, and sheath; upon the last lies the *descendens noni* nerve.

To tie the carotid in its lower part the patient must be placed on his back, with shoulders raised, head thrown back and slightly turned toward the opposite side; an incision three inches in length is made on the inner margin of the sterno-mastoid muscle; this incision should extend from opposite the thyroid cartilage to the sternum, and must be carried through skin, platsyma and superficial fascia. The sterno-mastoid must now be relaxed by turning the head to the side operated on; now expose the edge of the sterno-mastoid, and look for and avoid the external jugular vein; separate and draw outward the sterno-mastoid and draw inward the sterno-hyoid and thyroid muscles. Scratch through the dense fascia which unites the omo-hyoid to the sheath, when the latter will be seen with the branches of the *descendens noni* upon it; this must be drawn aside. The sheath must be pinched up with the forceps and opened with a careful touch of the knife, its flat surface toward the artery. Enlarge the aperture on a director, detach the artery from its connections for a limited extent, with a

FIG. 44.



LIGATURE OF THE CAROTID.

probe and an aneurism needle, which, armed with a ligature, is passed around the vessel from without inward; avoid the vagus nerve, by keeping the point of the needle close to the vessel. When the point appears on the inner side seize the ligature with the forceps, and withdraw the needle; ascertain that the nerve is not included in the ligature, and tie it with a double surgeon's knot.

To tie the common carotid in its upper part. Patient is placed on his back; head thrown back; an incision three inches long is made through the skin and platysma, on the anterior edge of the sterno-mastoid muscle, from a little below the corner of the lower jaw to opposite the cricoid cartilage. The deep fascia is now pinched up, opened and carefully divided; the edges of the wound are then to be drawn asunder; next feel for the pulsation of the artery; open the sheath over it, care being taken to get on the inner or artery side of the septum, between the artery and vein; do not include the *descendens noni* in front or the vagus and sympathetic nerve behind. Expose but a small portion of the artery, and pass the aneurism needle from without inward.

The external carotid may require to be ligated. An oblique curved incision should be made through the skin, platysma and fascia, in the direction of the posterior belly of the digastricus, from below the lobe of the ear to the hyoid bone; the vessel is to be secured below the part where it is crossed by the digastric muscle and ninth nerve.

Arteria Innominata. The patient is to be placed on his back, with shoulders raised and head thrown back; an incision two and a half inches in length is to be made along the inner margin of the sterno-mastoid, terminating at the clavicle, and another across the origin of that muscle, meeting the former at an angle; the flap thus formed is to be turned up, and the sterno-mastoid divided at the sternal and part of the clavicular origin. Turn aside the areolar tissue and fat, and divide the sterno-hyoid and thyroid muscles. Scratch through the strong fascia which is next presented, very cautiously; then trace the carotid carefully, with the finger, to its origin. The vena innominata must then be held down with a spatula, and a ligature, carried *from without inward*, must be brought around the artery close to its bifurcation, care being taken to avoid the vagus, recurrent and cardiac nerves and pleura.

The Subclavian Artery. The ligation of the first and second parts of the artery is rarely performed. In the *third part* of its course it is about one and a quarter inches long, and passes from the outer border of the *scalenus anticus*, downward and outward, under the clavicle, to the lower border of the first rib, when it becomes the axillary.

The patient must be laid on a table, with the shoulder of the affected side drawn downward and forward, and the head turned to the other side. An incision from three to four inches long is then made, above and parallel with the clavicle. It must cut through the skin and platysma, and extend from the outer edge of the sterno-mastoid to the trapezius. The external jugular, now exposed, must be drawn aside with a blunt hook; it is generally more convenient to draw it to the inner side, or it may become necessary to ligate and cut it. The clavicular portion of the sterno-mastoid must be divided. The fascia must now be carefully divided, tearing it with the forceps if possible. The omo-hyoid is to be drawn up.

Should either the *supra-scapula* or *transverse colli* be met with it is to be drawn aside.

The anterior scalenus having been traced to its insertion in the rib, the pulsations of the artery will be then felt, when the surrounding areolar tissue must be carefully torn through with the finger. Care must be taken to avoid the lower trunks of the brachial plexus of nerves, which may appear first; the cessation of the pulse at the wrist when the trunk is pressed by the finger, is good evidence that it is the sought for vessel and not a nerve. Venous hemorrhage, if troublesome, and cannot be controlled by pressure, must be stopped by tying the veins.

The ligature must be carefully passed *from below upward.*

The Axillary Artery extends from the lower border of the first rib to the lower end of the *teres major*, in the axilla; surgically, it is divided into that portion where it lies thickly covered by muscle, and secondly, where it can be felt against the humerus on the axilla.

To tie the artery in the upper part of its course, the shoulder and arm must be drawn back, so as to put the pectoral muscles on the stretch; an incision, four inches long, is then to be made from the coracoid process inward, in a transverse depending curve, half an inch below the clavicle. The clavicular fibres of the *pectoralis* major are then to be divided to the same extent; the lower border of the wound is then to be drawn downward, the costo-coracoid membrane cut through, when the edge of the pectoralis minor will be readily seen, crossing upward and outward over the vessels and nerves. Wounded branches of arteries should at once be tied.

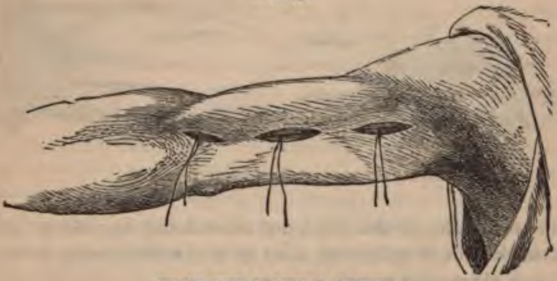
To relax the *pectoralis major*, the arm should now be brought to the side; a few scratches with a director will expose the axillary vein, which should be held inward. Then seek for the beating of the artery, which must be carefully isolated, and an aneurism needle passed from without *inward.*

The nerves lie on the outside and behind, and care must be taken not to include them with the artery.

To tie the axillary artery in its lower part, the patient is placed on his back, the arm placed at right angles with the trunk. The axillary vessels and nerves lie between the *pectoralis major* in front and the *latissimus dorsi* and *teres major* behind, and can be readily felt against the upper end of the humerus; the *coraco-brachialis* and biceps being placed externally.

The operator makes an incision, two and a half inches long, parallel with the upper end of the humerus, between the *pectoralis major* and *latissimus dorsi;* he then dissects carefully through the fascia, until the basilic, axillary vein and median nerve are revealed; the vein is to be drawn inward and the nerve outward, the artery being found between them, and is exposed by tearing with the forceps and director. Care is to be taken not to wound the thoracic and subscapular veins. The aneurism needle is passed between the vein and artery.

FIG. 45.



TYING THE BRACHIAL ARTERY.

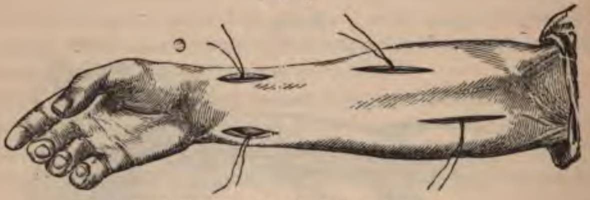
The Brachial Artery passes obliquely down the inner side of the humerus, to the middle of the bend of the elbow; it runs along the inner borders of the *coraco-brachialis and biceps*, which form the guides to it. It is accompanied by two *venæ comites*, and is encircled by their numerous branches; it is likewise accompanied by the *median nerve*, which first lies on its outer side, between it and the *coraco brachialis;* then crosses over it, and is quite internal to it at the elbow.

To tie the brachial at its upper third, the limb must be drawn from the side and supinated. The operator identifies the *coraco-brachialis*, and feels the pulsation of the artery; he then makes an incision, three inches in length, over the artery, opposite the middle of the *coraco-brachialis;* divides the fascia to the same extent; the basilic vein will probably be found to the inner side of the artery. The forearm may now be bent, to relax the parts, and the muscles, if in the way, must be drawn aside; the sheath of the artery opened, and the median nerve drawn aside. Having identified the artery, by its pulsation or the appearance of its coats, the needle must be passed in whatever direction the operator finds most convenient.

To tie the brachial artery in the middle of the arm, the incision is to be made along the inner side of the biceps, at the *insertion* of the *coraco-brachialis* muscle. The median nerve usually lies over the vessel, and must be drawn aside; the biceps being well relaxed, the needle should be passed from within outward.

To tie the brachial artery in its lower third, an incision, from two and a half to three inches long, should be made obliquely, about half an inch internal to the tendon of the *biceps,* first ascertaining its position; and the median basilic vein, if in the way, must be held aside, passing the ligature needle *from the median nerve.*

FIG. 46.



TYING THE RADIAL AND ULNAR ARTERIES.

The Radial Artery in its upper third lies deeply between the *pronator teres* and *supinator longus,* and is overlapped by the last named; in its lower two-thirds it lies between the tendons of the *supinator longus* and *flexor carpi radialis;* it is accompanied by venæ comites, and in the middle third by the radial artery. To tie it, the forearm must be held in the supine position; an incision, two and a half to three inches long, must be made over its course, the fascia cut through, and the muscles separated and turned aside; then separating the venæ comites, the ligature needle is to be passed *from without inward.*

To tie the radial artery on the outer side of the wrist, an incision is to be made through the skin, from opposite the styloid process of the radius to the commencement of the first interosseous space. The guide to the artery is the *extensor secundi internodii pollicis*, which crosses the artery before it dips into the palm. The ligature is to be applied on the ulnar side of the tendon.

The Ulnar Artery in the upper half of the arm is covered by the four superficial muscles which arise from the inner condyle; in the lower half it is more superficial, and lies between the *flexor digitorum sublimis* and the *flexor carpi ulnaris*. The artery is accompanied by two veins. The median nerve lies first on the inner side; it then crosses in front of the artery, and descends along the middle of the limb, lying on the ulnar side of the artery.

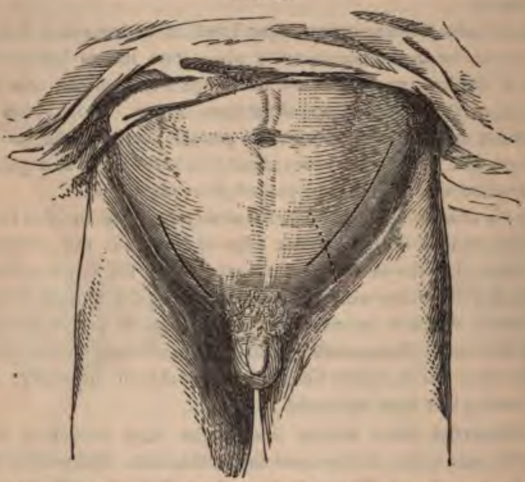
To tie the ulnar artery in the upper third of its course, a longitudinal incison should be made, commencing about two inches below the inner condyle of the humerus, and one-third of the width of the arm from the inner edge, extending downward about three inches. The division between the muscular mass should be begun, if possible, between the tendons and carried upward. The ulnar nerve should be looked for as a guide to the artery, and the needle should be passed *from the nerves*.

To tie the ulnar artery just above the wrist requires an incision two inches long, about an inch from the inner edge of the limb; the incision should be just external to the *flexor carpi ulnaris*. After the skin and fascia have been divided, the artery will be found covered by the tendon of the *flexor carpi ulnaris*, which is internal, and the tendon of the *flexor digitorum sublimis* external. The needle should be passed from within outward, to avoid the ulnar nerve, which lies to the inner side of the artery; the *vena comites* having first been separated.

The External Iliac Artery lies on the inner border of the psoas muscle, the vein being on the inner side and below. The genital branch of the *genito-crural* nerve lies on it for a short distance. The artery is invested by the peritoneum, and high up is crossed by the sigmoid flexure of the colon on the left side, and by the ilium on the right side; the ureter is near its division. Low down it is crossed by the spermatic cord in the male and the round ligament in the female, and is crossed by the *circumflex iliac* vein.

To tie the external iliac the patient must be placed flat on a table, so that the abdominal muscles may be rendered tense. Make an incision, three and a half or four inches long, above and parallel to Poupart's ligament, beginning about half an inch outside the external abdominal ring; carry it through the skin and superficial fascia, and lay bare the external oblique tendon. Then cut through this tendon, the *internal oblique* and *transversalis muscles*, to the extent of the incision. A portion of the muscular fibres should be lifted with the forceps and carefully cut through, to form an opening into which a broad, flat, grooved director must be insinuated, and the muscle divided upon it to the necessary extent. Now gently draw the edges of the wound asunder with bent spatulæ; the opening must be enlarged by tearing with the fingers. Then carefully strip the peritoneum off from the iliac fossa until the finger reaches the artery. The sheath must be scratched through with forceps and director at the point selected, and the artery separated from the vein; the aneurism needle is then passed between them, excluding the *genito-crural* nerve. The wound must be brought together by sutures, and the trunk bent forward, to relax the muscles.

FIG. 47.

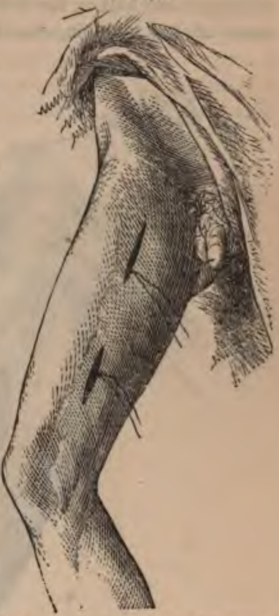


LINES OF INCISION FOR LIGATION OF EXTERNAL, COMMON AND INTERNAL ILIAC ARTERIES.

The Common Iliac Artery. To tie this artery make a slightly curved incision, six inches in length, the lower third being about two inches above Poupart's ligament and parallel with it. Divide the muscles and tear through the transversalis fascia; gently repress the intestines upward, which will protrude through the wound, and separate the peritoneum from the iliac fossa. When the brim of the pelvis is reached, seek the external iliac, which is a guide to the common trunk. Open the sheath just above the bifurcation, and, if possible, pass the needle from within outward.

The Femoral Artery. *To tie the femoral artery in its upper division,* first ascertain its course, which is indicated by a line drawn from the middle of Poupart's ligament to the inner femoral condyle, when the knee is bent and the thigh turned outward; an incision, three or four inches in length, must be made over it, about two or three inches below Poupart's ligament. Divide the fat and superficial fascia; the saphena vein lies on the inside of the incision. Then divide the *fascia lata* to the same extent as the skin. Draw the *sartorius* gently outward, which will expose the sheath of the artery; open it sufficiently to admit the needle, being careful not to transfix the vein; to avoid this use a blunt needle; pass it *from the inner side.*

FIG. 48.



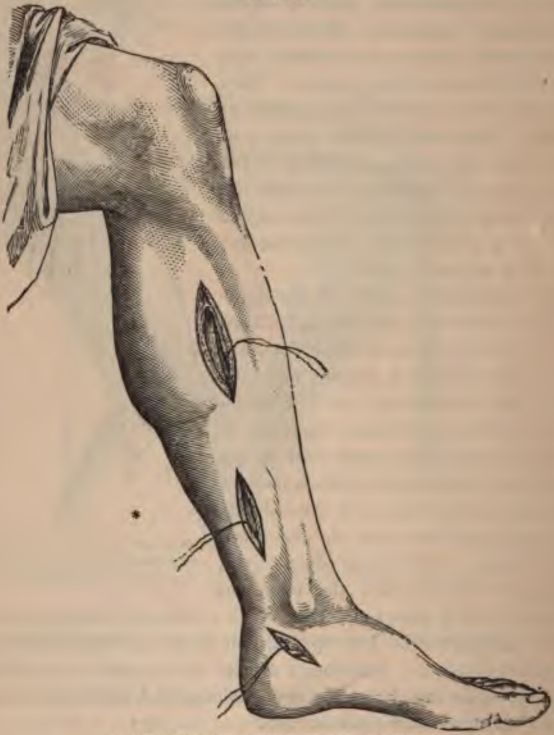
LINES OF INCISION FOR LIGATURE OF THE SUPERFICIAL FEMORAL ARTERY.

To tie the femoral artery in the lower part of its course in Hunter's canal. Turn the limb a little outward, bend the knee and raise the leg on a pillow; make an incision three inches long, in a line drawn from the middle of Poupart's ligament to the inner condyle, the upper half in the middle third, and extending down into the lower third of the thigh; cut through the integument and take care to avoid the *saphena* vein. Divide the deep fascia, expose the *sartorius* and the tendinous aponeurosis which passes under it. With a retractor have the edge of the muscle held outward. Lift up a portion of the aponeurotic sheath with forceps and divide it. Introduce a director and divide the sheath upon it; the artery will be found with the vein behind, and a little to the outer side. Pass the ligature from without inward.

To tie the **Popliteal Artery,** the patient is placed on his face, with his knees straight; cut through the skin and fascia lata to the extent of three inches on the outer border of the semi-membranosus muscle; press the muscle inward and the artery will be felt, with the vein and popliteal nerves lying superficial and external to it; cautiously separate these, draw them outward, and pass the needle around the artery.

To tie the **Posterior Tibial,** in the upper part of the leg, the patient should lie on his back, with the limb lying on its outer side, the knee half bent, and the foot extended on a pillow. An incision, four inches long, half on the upper and half on the middle third of the leg, and an inch from the inner edge of the tibia, should be made through the skin and superficial fascia. Avoid the *saphena* vein. Divide the deep fascia, expose the muscles and draw aside the *gastrocnemius;* expose the *soleus,* which is to be severed, then pinch up the fascia, perforate and divide it on a director; now divide the fascia which intervenes between the superficial and deep muscles, when the artery will be exposed, lying on the *tibialis posticus.*

FIG. 49.

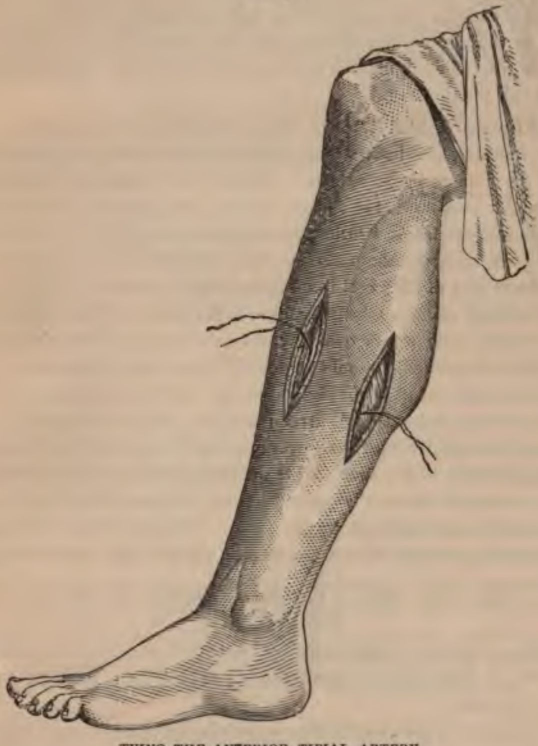


TYING THE POSTERIOR TIBIAL ARTERY.

The two veins are in very close contact; the nerve is superficial to the artery, and frequently to the outer side. Pass the ligature from without inward.

To tie the posterior tibial in the middle of the leg; make an incision, three inches long, in the middle and lower third of the leg, half-way between the inner edge of the tibia and the inner border of the tendo-*Achillis*. Divide the fascia. The artery, surrounded with fat, accompanied by two veins, will be found along the inner edge of the *flexor longus digitorum;* the nerve is on the outer side. In the upper part of the leg, the posterior

FIG. 50.



TYING THE ANTERIOR TIBIAL ARTERY.

tibial nerve lies to the inner or tibial side of the artery; it passes over it about the middle, and inferiorly it lies to its outer or fibular side. Pass the ligature from without inward.

To tie the posterior tibial at the ankle, make a slightly curved incision, two and a half inches long, in the groove, half-way between the hinder edge of the internal malleolus and the extremity of the heel, commencing near the tendo-Achillis; divide the superficial fascia, the dense fibres of the internal annular ligament, which adheres to the sheaths of tendons, and covers the vessels and nerves; and the artery will be found with its venæ comites. The ligature is to be passed from below upward, avoiding the posterior tibial nerve.

The Anterior Tibial Artery. To tie this vessel in the *middle of the leg* make an incision, four inches long, through the skin, half way between the spine of the tibia and the external edge of the fibula. Now divide the intermusuclar septum between the *tibialis anticus* and *extensor longus digitorum*, cut the fascia a little transversely in the middle of the incision; raise the toes, separate the muscles with the finger from below upward. At the lower part of the incision separate the *extensor proprius pollicis* from the *tibialis anticus;* keeping close to the latter. The artery is deeply seated, lying on the interosseous membrane, the nerve in front and a vein on either side. The needle should be passed from without inward.

To tie the anterior tibial *in the lower part of the leg*, make an oblique incision, upward and outward, three inches in length, commencing at the junction of the middle with the lower third of the leg, half an inch external to the spine of the tibia; then divide the fascia covering the *tibialis anticus*, and the artery will be seen lying on the tibia external to the lower portion of the muscle, accompanied by its veins. When the nerve is separated from the artery, the ligature needle is to be passed from without inward.

CYSTITIS, OR ACUTE INFLAMMATION OF THE BLADDER.

Cystitis arises in consequence of neglected or ill-treated gonorrhœa, from gout, or from chronic inflammation induced by stone, stricture, or diseased prostate.

The **symptoms** are pain in the perineum, groin or sacrum, tenderness of the lower part of the abdomen, frequent micturition, attended with great straining, followed by the aggravation of the pain with a mucous or muco-purulent sediment in the urine.

Treatment. Begin with a calomel purge; if the pain is great, give opium or morphia by the mouth, or by enema, in sufficiently large doses to insure relief. Apply leeches to the lower portions of the abdomen or perineum; hot baths and warm fomentations. After proper depletion has been used, give diaphoretics; antimonial and saline mixture, with full doses of morphia or aconite. For irritable stomach, the effervescing draught is considered most preferable. When the urine is scanty, high colored and acrid, nitrate of potassa or spirit of nitrous ether should be used. In the latter stages of the disease, give an infusion of uva ursi and hops, which may or may not be combined with morphia and bicarbonate of sodium, or morphia and balsam of copaiba, as circumstances may seem to warrant.

URINARY CALCULI.

Urinary Calculi are found in four different situations in the urinary organs: in the kidney, ureter, bladder and urethra.

A precipitate let fall from the urine after it has been voided is called a *sediment;* when precipitated in the bladder or kidneys it is called *gravel;* and gravel lodging in any part of the urinary passages may concrete into *stone.* When the urine habitually presents any one kind of deposit, the patient is said to have a corresponding *diathesis*, as the lithic diathesis, etc.

The lithic or uric acid, or red gravel, is deposited in the form of minute crystals, tinged with the coloring matter of the urine.

The *lithates of ammonia, soda* and *lime* form a very common sediment, varying in color from nearly white to dark red. Urine generally acid.

Oxalate of lime is generally deposited from urine which is acid and contains much lithate.

Phosphatic deposits may arise from excessive secretion of the mucus of the bladder, or from a primary alkaline or insufficiently acid state of the urine.

When a patient is secreting the red crystalline gravel, or has a *fit of the gravel*, as it is called, he generally complains of great pain in the loins and bladder, frequent desire to make water, and aching of the testicles and hips; sometimes there is feverishness, with languor and dyspepsia.

Treatment. The patient should be treated on general principles; if he be lusty, with red lips, has been living highly, and has not been long an invalid, he will generally be relieved by purgation, a reduced diet, warm baths, and liq. potassæ, in doses of ʒj, thrice daily, after meals. Exercise, temperance and restricted diet will correct this diathesis.

But if the urinary deposit is caused by feebleness of the powers which ought to convert food into healthy flesh and blood, or by overwork, the treatment should begin with judicious purgation, with change of diet and air, and a persistent tonic course; nitro-muriatic acid may be given with benefit; quinine, nux vomica, muriated tincture of iron, etc.

Various Kinds of Stone. The chief varieties are the lithic, phosphatic and mulberry.

Lithic or Uric Acid stones are generally oval, flattened, fawn or mahogany colored. This stone may be dissolved by boiling in liquor potassæ; it burns away under the blowpipe, and if digested in nitric acid, and evaporated at a very gentle heat, it leaves a residue which, when cold, becomes purple, if exposed to the vapor of ammonia.

Triple Phosphate forms white or pale gray stones. When treated with liquor potassæ evolves ammonia; is soluble in acetic and muriatic acid.

The **Mulberry stone** is composed of oxalate of lime. It is dark red, rough and tuberculated. It is not dissolved by boiling in potassa; is soluble in nitric acid; exposed to the blowpipe, the acid is burnt off and quicklime is left.

STONE IN KIDNEY AND URETER.

Symptoms of stone in the kidney are pain in the loins, irritation and retraction of the testicle; urine bloody after jolting exercise, and occasional attacks of inflammation of the kidney. They are most frequently composed of lithic acid, known by the deposit of red sand from the urine.

Treatment. Attend to the general health; expedite the passage of the stone by diluents and diuretics; bicarbonate of soda, acetate of potassa; remove inflammation by cupping, leeches on the loins, mild aperients, enemata of warm water, warm baths, sedatives, etc.

The ordinary and most favorable course of a stone in the kidney is to descend through the ureter into the bladder. Should it remain in the kidney, it may increase in size and fill up the pelvis and infundibula, and cause the organ either to waste or suppurate.

The passage of a *stone through the ureter* is known by sudden and severe pain, first in the loins and groin, subsequently in the testicle and inside of the thigh. The testicle is retracted spasmodically. Another is violent sickness, faintness and collapse, which may last two or three days, and is only relieved when the stone reaches the bladder.

Treatment. Warm baths, large doses of morphia or chloral, emollient enemata, plenty of diluents. During the paroxysm chloroform may be *inhaled,* to relieve pain and allay spasm.

STONE IN THE BLADDER.

Symptoms. Irritability of the bladder, with frequent irresistible desire to make water, occasional sudden stoppage of the stream of water during micturition, and the stream flowing again if the patient throws himself on his hands and knees, occasional pain at the neck of the bladder, pain in the glans penis, and frequently passage of blood and crystals of uric acid or oxalate with the urine; if a child, elongation of prepuce, from his attempting to alleviate his pain by pulling at the organ.

But to make sure of the existence of stone, a *sound* must be employed, when it will be made sensible to the touch and to the ear. The *sound* is a solid steel rod, of the size of the medium catheter; its handle is polished, and its shaft is smaller at the end, so as to move easily into the urethra. Sometimes the stone cannot be felt, either on account of an enlarged prostate, or because cysts or pouches exist in which the foreign body is hid.

The symptoms of stone vary in severity, according to its size and roughness, the state of the urine, or the condition of the bladder, whether healthy or inflamed.

Treatment. The indications are to get rid of the abnormal condition of the urine: to allay pain and irritation, and to remove the stone. The first two measures have already been spoken of.

Lithotrity and *Lithotomy* are the methods pursued to remove the stone.

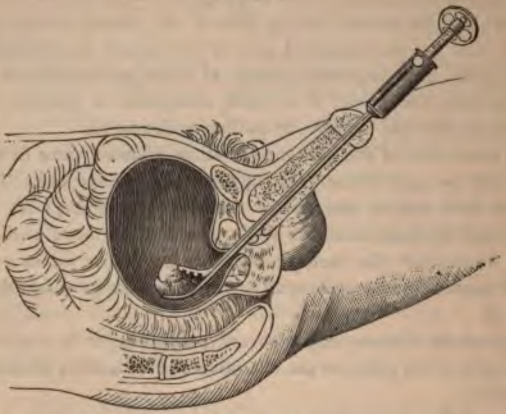
Lithotrity is an operation for crushing stone in the bladder into fragments of so small a size that they may readily be expelled through the urethra; the instrument generally used is the lithotrite of Bigelow.

The best cases are those with a urethra of full size, and a bladder neither irritable, contracted nor paralyzed. The danger is in mechanical injury to the bladder.

The patient should be placed on his back, on a couch, with his head on a pillow, knees gently raised and supported, and a little apart. The pelvis should be raised above the level of the shoulders.

The object is to get the stone away from the neck of the bladder. The bladder should hold from four to eight ounces of water. The instrument, warmed and oiled, is now to be gently introduced and passed fully into the bladder. The next step is to seize the stone; this is done by applying the instrument to the stone, so as to seize and lift it, by *rotating* the instrument upon the axis of its shaft. When the stone is fairly grasped, the screw is employed to crush it; at the end of the operation it must be seen that the blades are entirely closed and not choked by detritus, while the instrument is withdrawn.

FIG. 51.



LITHOTRITY.

Subsequently, pain must be relieved by opiates. Hip baths and demulcent drinks must be used, to allay irritation. The operation must be repeated at intervals, till every fragment is crushed and expelled.

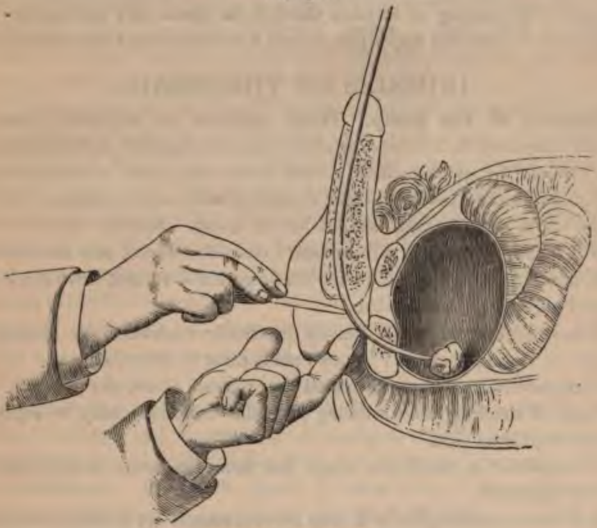
LITHOTOMY.

There are several methods by which lithotomy may be performed.

1st. The **Lateral operation.** The bladder may contain a little water; the bowels should be cleared previously by an enema.

A good firm table, 2½ feet high, is necessary for the operation. The patient should lie down and chloroform be administered. The sound or a staff should then be introduced and made to touch the stone, if possible, so that there may be no mistake. The patient should then be placed on his back, with his shoulders raised by a pillow. Then the perineum should be thoroughly exposed; the thighs must be raised and separated; knees bent, and each foot must be grasped with the hand of the same side. The hand and foot must then be firmly bound together with a bandage. The buttocks should be brought to the edge of the table and the perineum shaved. An assistant on each side holds the thighs asunder; the surgeon places the fingers of the left hand on the right buttock, and with the thumb fixes and steadies the integuments of the perineum, taking care not to draw them up. He then makes a free incision of the skin and subjacent tissues, entering the knife just on the left side of the raphé, about one and three-quarter inches in front of the anus, and cutting downward to midway between the anus and the tuberosity of the ischium. The blade of the knife should next be run along the surface of the exposed fat and cellular tissue, and then the forefinger of the left hand thrust into the wound, about its middle, and directed upward and forward between the left erector and accelerator muscles; the finger then feels the groove of the staff in the membranous part of the urethra.

FIG. 52.



LATERAL OPERATION.

The left forefinger nail is now to be well fixed in the groove of the staff; the knife is slipped in over it, with its flat surface obliquely placed; its points made to slide along the groove toward the bladder, dividing the membranous part of the urethra and the edge of the prostate. The knife being withdrawn, the left forefinger is gently insinuated along the staff. Next the assistant removes the staff and the surgeon introduces the forceps over the finger into the bladder.

2d. The **Bilateral operation** is performed by making a curved incision, with the convexity upward, from one side of the perineum to the other, carrying it between the anus and the bulb of the urethra, opening the membranous portion of the urethra, and then pushing the *bistouri caché* into the bladder, by which both sides of the prostate may be divided.

3d. The **Recto-vesical operation** consists in cutting into the bladder from the rectum, in the middle line behind the prostate.

4th. The **High operation** is performed in the hypogastric region above the pubes, by making an incision through the linea alba and opening the bladder at its fore and upper part, where it is not covered with peritoneum.

INJURIES OF THE HEAD.

Wounds of the Scalp. These must not be neglected, however slight; they may be followed by erysipelas, inflammation and suppuration. They should be quickly closed; care should be taken to wash away all foreign bodies and *clots* with clear *carbolized* water and a syringe. No part of the scalp, however torn, should be cut away. Stitches should not be used if it can be avoided. In ordinary cases the wound may be united by plasters and bandages. Patient should be confined to bed, or to the house, purged and put on a milk diet.

Hemorrhage from small vessels is usually controlled by closing the wound and using pressure; larger vessels must be secured.

If *suppuration* occurs, indicated by rigors, chills, dry tongue, with increase of swelling and throbbing pain, the adhesions may be separated at any suspicious spot.

In *suppuration under the scalp*, free incisions down to the bone are clearly indicated.

If there be *serous effusion* it may be necessary to let it out by one or two punctures.

CONCUSSION OF THE BRAIN.

Concussion is a sudden interruption of the functions of the brain, caused by a blow or other mechanical injury of the head.

Symptoms. In ordinary cases the patient lies for a time motionless, unconscious and partially insensible; the pupils are more or less contracted and the patient turns away irritably from the light; if roused and questioned he answers hastily and again relapses into apparent insensibility; after a time he moves his limbs as if in an uneasy sleep, vomits and frequently recovers immediately afterward; remaining, however, giddy and confused for some hours after.

In the more severe cases the patient is profoundly insensible, the surface and extremities pale and cold, and the features ghastly; the pupils are sluggish and sometimes dilated, but equal on both sides, unless the brain is injured; the pulse is quick, feeble and intermittent, or hardly to be felt, and the breathing slow, or performed only by a feeble sigh drawn at intervals.

Vomiting is an important symptom. Its presence is generally an indication of approaching reaction and recovery. As reaction goes on, the pulse at first quickens, becomes stronger and slower, the carotids throb perceptibly; there are black spots and flashes of light in the eyes and noises in the ears; pain in the head is felt and increases; the eyes are suffused and the face flushed.

If the concussion be very severe it may be followed by immediate death.

Concussion is occasionally succeeded by a peculiar state of insensibility, which may last some days. The patient lies as if in a tranquil sleep; his pulse is regular, but on the slightest exertion it rises to 130 or 140; when roused he answers questions, but immediately relapses into unconsciousness.

Treatment. To recover the patient from insensibility and collapse, apply friction to the surface with hand, and warm applications to the feet; mustard plasters to the calves of the legs.

After reaction has taken place, the bowels should be acted on; quiet in a dark room, with rest and low diet, should be observed.

If the pulse becomes hard and frequent, and if the patient complains of pain, throbbing or tightness in the head, or if he becomes flushed or delirious, or stupid and comatose, or if vomiting returns, blood should be taken from the arm, or by leeches from the head, and purgatives should be administered. The head should be kept cool. The patient should observe a cautious diet, and remain free from excitement or fatigue for some time after the occurrence of the injury.

The consequences of concussion are persistent headache, deafness, giddiness, squinting, loss of memory, tinnitus aurium, etc.; for these, a mild course of mercury may be necessary, together with repeated blisters, change of air, etc.

COMPRESSION FROM EXTRAVASATED BLOOD.

The symptoms are those of apoplexy. Insensibility, palsy, dilated and insensible pupil; slow, laboring pulse; skin often hot and perspiring; retention of the urine, through palsy of the bladder; involuntary discharge of fæces, through palsy of the *sphincter ani;* stertorous breathing, owing to palsy of the *velum pendulum palati; whiffing* or *puffing* respiration, from palsy of the buccinator and other facial muscles. The palsy, if it exists, will vary greatly in degree; if it be on one side, it will be opposite to the injury of the head. There may be convulsions, muscular twitchings, or rigidity.

Compression may be produced by extravasation of blood, by fracture of the skull with depression, and by suppuration within its cavity.

The symptoms of compression by extravasation generally show themselves by the patient becoming stunned and insensible, from the concussion, with feeble pulse and cold skin. After awhile he recovers his senses, more or less perfectly, but again, in an hour or two, becomes sleepy, confused, and insensible, with slow, stertorous breathing, slow pulse and dilated pupils.

Diagnosis. In concussion, the symptoms follow the accident immediately; those of compression from effusion of blood *may* come on after an interval. In concussion, the pulse is feeble, irregular or intermittent, the skin pale, and the respiration sighing and weak; in compression, when reaction is thoroughly established the pulse will be slow and full, and the skin hot and perspiring.

In concussion, stertorous breathing and muscular palsy are rare; in compression they are common.

In concussion the pupil is variable; sometimes contracted and sometimes dilated; in compression it is almost always dilated and insensible; sometimes unequal on the two sides.

Treatment. Shave the head and examine it carefully; if there be no sign of fracture or injury, treat the case as one of apoplexy; the *indications* are to lessen hemorrhage and arrest inflammation by cold applications and purgatives.

If insensibility continues and the patient grows gradually worse, it is recommended to trephine him, in the hope of letting out the blood that has extravasated underneath, and thus relieve the pressure.

FRACTURES OF THE SKULL.

These are caused by great violence, such as blows or falls on the head, and gunshot wounds.

The **symptoms** and consequences of fractures of the skull depend on the conditions which accompany it, especially the amount of concussion; the forcing in of portions of the bone; the complication with scalp wounds; the situation and the inflammation excited.

Simple fracture with depression may be ascertained by examination of the shaved scalp; there will be a depression at one part, with a corresponding edge or projecting ridge around it.

Treatment. In a case of simple depressed fracture, if there be no symptoms of compression, and if the patient is conscious and rational, he should be kept on the strictest regimen; lying down, head raised; cold water to head and aperients are the remedies. If there be *slight* symptoms of compression the same plan will answer.

If the fracture be **compound,** with slight depression, it is best not to trephine unless the symptoms are urgent.

If **comminuted,** and it is probable splinters are sticking into the brain or its membranes, the bone must be elevated. If possible, it should be done with the elevator alone.

Fracture of the inner table. The inner table may be extensively splintered by injuries which perforate or slice through the outer table; such as cuts from sabres and blows with heavy weights. If after careful examination it is found that depression exists, the trephine should be used to raise or remove splinters.

Fractures of the base of the skull may run in various directions; they are most frequently found passing through the petrous, squamous and sphenoid bones.

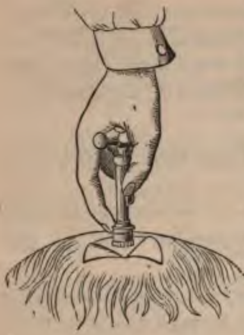
The **diagnosis** will be founded on the nature of the injury; the patient will probably be injured from having been pitched on his head; there will probably be bleeding from one ear; after the bleeding has ceased a most significant symptom is the draining through the ear of a clear fluid; symptoms indicating damage to the nerves that escape from the base of the skull may be noticed; bleeding from the nose and mouth will show the direction of the fracture.

Symptoms and prognosis depend on the amount of injury to the brain; stupor, dilated and unequal pupils, with rapid pulse, hot skin and dry tongue and delirium are unfavorable symptoms.

Treatment. Absolute repose, low diet, giving the patient a purge, ice or cold water to the head, are the remedies.

Trephining. The pericranium being raised, by means of a blunt scalpel, from the part which is to be perforated, the surgeon applies the trephine with the point of his forefinger protecting the crown, and working it with an alternate pronation and supination of the wrist; and when it has made a circular groove deep enough to work it steadily, he must take care to withdraw the centre pin. He must saw steadily and cautiously, frequently examining the groove, to ascertain whether he has reached the dura mater, and when he has he introduces the broad curved forceps, to raise the circular piece of bone. The greatest care must be taken to fix the centre pin and the greater part of the circumference of the instrument on firm bone, and by no means press heavily while sawing on any piece of bone that is loose or yielding. When the saw reaches the diploë there will be an escape of blood with the bone dust, but there is no diploë in either children or aged persons.

FIG. 53.



TREPHINING.

When the piece of bone is removed the surgeon must gently insinuate the point of the elevator under that which is driven in, and using his finger, or the edge of the firm bone, as a fulcrum, slowly raise it to its proper level. All loose fragments having been removed and the wound sponged, the scalp must be carefully laid down.

HARE LIP.

Hare Lip is a congenital fissure of one or both lips; generally perpendicular, but it may be more or less oblique.

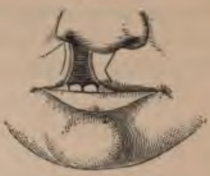
As a rule the division is just below the septum of the nose, but it sometimes corresponds to one of the nostrils.

Hare lip may be single or double; single when the fissure is only on one side, and double when there are two fissures with a small flap of skin between.

In the operation for the relief of hare lip the principle is union by the first intention.

If the case is one of single hare lip, detach freely the lip from the bones behind, then pare off the edges of the fissure by means of a small bistoury; care must be taken to cut off a sufficient quantity of the edge, as at the margin the parts are apt to be callous. The surgeon pierces the lip with a narrow knife at the top of the fissure, just under the nose, and carries the instrument downward, so as to shave off the edge of the fissure; the operation is then repeated on the other side, and the two strips are then *detached at the* upper angle. The parts are now brought together as

FIG. 54.



HARE LIP.

nicely as possible, and retained in their position by means of the twisted suture. Three pins should be used for the purpose; the first is put at the edge of the red margin of the lip, and the two others at equal distances higher up. Then a long piece of thick silk should be twisted around the pins, and the suture covered with collodion. The pins used should be galvanized, or made of silver; in the absence of these, needles may be employed, when the point should be carefully clipped off after the silk has been twisted around them. If the hare lip is double, the operation should be conducted as in single hare lip, but the closure of the second fissure should not be attempted for at least two weeks after the first operation.

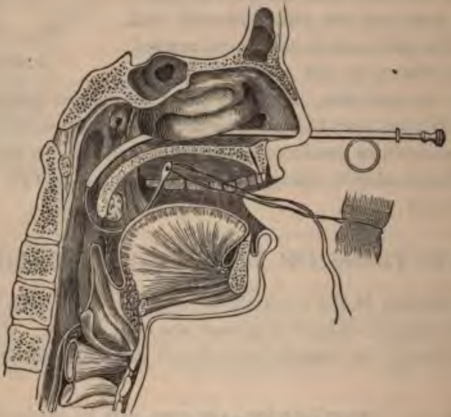
AFFECTIONS OF THE NASAL PASSAGES.

Foreign Bodies in the nares should be removed as soon as possible; their removal may be effected by a small scoop or canula. If they cannot be brought through the nostrils, they should be gently pushed back into the throat.

Epistaxis, *i. e.*, hemorrhage from the nose, may be produced by injury, by vascular excitement, plethora, or determination of blood to the head, by the suppression of some other discharge, by irritation of the mucous membrane, by passive draining of venous blood, and by a want of tone or contractility in the blood vessels.

Treatment. If the patient be full blooded and plethoric, and subject to headache and giddiness, a purgative should be administered, and the diet regulated; if the bleeding continues, aromatic sulphuric acid should be given, and if the patient be anæmic, iron and quinine should be used. If it is a *passive hemorrhage*, depending on general cachexy, the patient should be kept quiet in a cool room; he should lie with his shoulders raised; he should suck and swallow pieces of ice, and should apply ice or ice-cold water to the nose and forehead; and a bladder of the same to the nape of the neck. In persistent cases, plugging the nostrils is necessary. This is done by Bellocq's canula, which is a curved silver tube, in which lies a curved spring, having at the end an eye for the reception of a piece of string; this is drawn into the canula, the curved end of which is passed along the floor of the nostril. The spring is then protruded by pushing the handle, causing the spring and string to appear in the back of the mouth below the soft palate, where it can be secured with the finger and forceps. The end of the string in the pharynx is then brought through the mouth, and a piece of soft sponge is tied to it; then, by pulling the string back through the nose, the sponge is drawn into the posterior opening of the nostril, leaving one end of the string in the corner of the mouth. The anterior nares should then be plugged by a fold of lint passed on the end of the probe and tied in by the nasal end of the string.

FIG. 55.



APPLICATION OF BELLOCQ'S CANULA.

FOREIGN BODIES IN AIR PASSAGES.

The foreign body may be impacted in the ventricles of the larynx, or in the trachea, in which case it will probably produce violent spasmodic cough and difficulty of breathing, together with fixed pain in one particular spot, a croupy sound during respiration, readily detected by the stethoscope; loss of voice, and probably acute inflammation.

It may be loose in the trachea, especially if it be a pebble, grain of corn, or coffee, or other smooth substance. In such case the violent coughing and sense of suffocation produced by the first introduction of the article generally subside for a time, but every now and then there are violent fits of coughing and spasmodic difficulty of breathing, during which the substance may be heard by means of the stethoscope.

It may have passed into one of the bronchi, where it is frequently detected by causing a whistling or murmuring sound, and it may be dislodged and driven upward when the patient coughs. The right bronchus is that into which it generally falls.

Treatment. Very little time should be wasted in attempting to get rid of the foreign body, until the operation of laryngotomy or tracheotomy is performed; it may be well, however, if the substance is movable and round, to place the patient on the bed and administer an opiate, when it may become coated with mucus, and may be expectorated during coughing or vomiting, or when the patient is narcotized he may be quickly turned upside down, when the foreign substance may suddenly be ejected; these devices failing, the surgeon must resort to—

Laryngotomy, if the substance is arrested sufficiently high up. This operation is performed by cutting longitudinally through the skin, then horizontally through the *crico-thyroid* membrane, which may be felt as a soft depression, an inch below the *Pomum Adami.*

Tracheotomy is performed by the surgeon standing on the left of the patient, whose head being thrown back, an incision an inch and a half or two inches long is made exactly in the middle line, from near the top of the sternum to the cricoid cartilage. The skin and superficial fascia are cut through; the sterno-thyroid muscles separated and a few fibres divided with the point of the knife; the loose cellular tissue and veins are cleared from the front of the trachea with the forceps, the thyroid gland is pushed up, a pair of slender hook forceps fixed in the trachea, so as to slightly draw it up; while the trachea is stretched, the surgeon passes his knife at the bottom of the wound and carries it upward, so as to divide two or three of the rings of the trachea.

Various other methods of performing tracheotomy have been devised, which the student can see by consulting larger works on Surgery; together with descriptions of tracheotomy tubes that are in use.

AFFECTIONS OF THE EAR.

Accumulation of Wax, mixed with hair and cuticle, is a frequent cause of deafness. The patient complains of loud noises, and of a feeling of discomfort and defective hearing. An examination with the speculum will allow the wax to be seen. It will generally be removed by syringing, but should it not be brought away after two or three efforts, the best plan is to fill the meatus with glycerine, stop it with a bit of cotton, and let it remain for twenty-fours, to soften the wax. The syringe may be then used again. A drop or two of olive oil, or of glycerine, should be inserted, after syringing. The water used should be warm enough to be comfortable.

Small Follicular Abscesses frequently form within the meatus, especially in persons of weak constitutions. They are apt to recur and are very painful. Fomentations as hot as can be borne, the application of a leech, or some preparation of opium give relief. When the abscess is bound down by tough skin, a puncture will relieve the pain promptly. If the pain is very great, the patient should be given a dose of morphia.

Eczema of the Auricle is apt to produce thickening of the lining membrane of the meatus and membrana tympani.

The treatment consists in giving, during the *acute* stages, purges, and applying soothing fomentations; in the latter stage the black wash may be used as an injection, or dilute ointment of nitrate of mercury. Tonics and alteratives should be administered, such as quinine, iodide of potassium, cod-liver oil, etc.

DISEASES OF THE EYE AND ITS APPENDAGES.

TRICHIASIS

Is that state of the eyelids in which they become altered in growth, and turned inward on the globe of the eye, irritating the conjunctiva on every motion of the eye.

Treatment. The only means that can be relied on for the cure of this condition, is to pluck away, with a broad forceps, the eyelashes, from time time, as they grow.

ENTROPIUM.

Entropium is inversion of the eyelids, produced from ulceration of the tarsi. The cicatrices formed by the healing of ulcers, which alter the shape of the lids so that the eyelashes are turned inward, irritate the conjunctiva and produce a continual state of irritation of the whole organ.

There is watering of the eye, with chronic ophthalmia, and in a short time vessels may be seen shooting over the cornea; nebulæ and ulceration of the cornea supervene, and a serious state of irritation of the transparent part of the eye is produced.

Treatment. Cut away a piece of skin from the affected lid; then bring the edges of the wound together by means of strips of adhesive plaster; a cicatrix is formed and the eyelids are drawn downward.

ECTROPIUM.

Ectropium, or eversion of the lids, happens from ulceration of their edges and from cicatrices and contractions of the skin of the lids, which tend to evert them.

The complaint is very distressing; the eye has not its natural covering; irritation, from extraneous bodies getting into it, is produced, and a constant state of chronic ophthalmia is kept up.

The usual treatment for the relief of this complaint is to remove a triangular portion of the lid, and bring the cut surfaces together.

FISTULA LACHRYMALIS.

By this term is understood all obstructions of the lachrymal passages, preventing the natural flow of the tears and mucus from the eyes to the nose.

The most common cause is a closure of one of the puncta, producing *epiphora*, or watering of the eye.

When the epiphora continues, the eye becomes irritable, an altered state of the lachrymal sac is produced, so that the seat of the disease is in the ductus ad nasum, and the tears, instead of finding their way to the nose, flow down the cheek.

Fistula lachrymalis may be divided into three stages: first, where there is simple distention of the lachrymal sac; secondly, where there is inflammation and suppuration of the sac; and thirdly, where there is a fistulous opening leading from the sac to the cheek.

Treatment. If there is acute inflammation of the sac, it should be treated with leeches, purgatives and cold lotions. If the pain increases in severity and becomes throbbing, the sac should be opened. In chronic inflammation of the sac, some astringent collyrium should be put twice a day in the inner angle of the eye, to be absorbed and carried into the sac.

If the retention of tears causes constant irritability, or if there is a fistulous orifice, an attempt should be made to restore the obstructed duct. The lower canaliculus should be slit up, and after it is converted into a canal, introduce a style and keep it there until the stricture is removed.

Another method is to probe the duct from time to time.

INFLAMMATION OF THE CONJUNCTIVA.

Acute Ophthalmia. The first symptom is redness of the part; the vessels become injected with blood. When the irritation continues, the vessels become still more apparent, and then a uniform appearance of redness is presented. There is more or less pain; this increases, and at length, on the admission of light, a sharp, lancinating pain is experienced; the eye is kept closed. The pain increases until the patient complains of burning heat and a sensation as though some extraneous body were lodged in the conjunctiva.

There is an abundant secretion of tears, but at the highest stage of excitement it is suddenly diminished, and there is preternatural dryness. The swelling is considerable. The swelling appears to be at the transparent cornea, and the conjunctiva is elevated in a circular fold, and this appearance is called *chemosis*. The lids are swollen. The neighboring parts also partake of the pain.

There will be a great degree of constitutional irritation, and usually symptoms of fever.

The principal causes of this disease are the admission of any extraneous body and variations of temperature, especially if accompanied by intense light and heat.

Chronic Ophthalmia. This term is applied to an attack of the disease that has existed for a length of time, and also to that state of inflammation which, from the commencement, has a character of atony and debility.

The *symptoms* of chronic differ from those of acute inflammation of the conjunctiva, rather in degree than in kind; the redness will be less intense; the pain less acute; the intolerance of light will be less; the effusion of tears will also be less; the constitutional and all the acute symptoms will be mitigated.

Chronic inflammation of the conjunctiva is apt to take place, where the patient has for a long time been laboring under disorder of the digestive organs. It is frequently a concomitant of dentition, measles or smallpox; rheumatism and gout.

Treatment. The antiphlogistic treatment should be resorted to early; general bleeding is necessary, and leeches in the neighborhood should be applied. Great benefit is to be derived from the use of diaphoretic medicines; the bowels should be freely acted upon; the diet should be low, and the patient should be kept at rest and in the dark. A blister to the nape will frequently be attended with beneficial effects.

When the *chronic stage* sets in, the evacuating plan may, to a considerable extent, be laid aside. The local applications must be moderately astringent and stimulating. Various collyria are used, such as alum in water, solutions of sulphate of zinc, or of copper, or the liquor plumbi *subacetatis*. The vinum opii is one of the best remedies.

PURULENT OPHTHALMIA.

Suppurative inflammation of the conjunctiva is the most severe form of inflammation in that membrane.

It is exceedingly acute, very rapid in its progress, and often very destructive in its ultimate effects; consequently it requires very active treatment.

Symptoms. The patient at first feels an uneasy sensation about the eyes, then some degree of pain on the admission of light; redness and swelling of the part; eyelids swollen; conjunctiva, where it covers the fore part of the globe of the eye, tumid; chemosis and frequently so much turgescence of the upper lid, as to prevent the patient from raising it.

Soon a fluid appears, that is not opaque at first, but in the course of twenty-four hours assumes the appearance of pus; it is thick, yellow, sometimes green, and poured out in considerable quantities.

The acute stage is of very short duration; there is a tendency to pass into the atonic stage, and also to terminate in sloughing. Sometimes the sloughing commences in a small portion, and gradually lamella after lamella is destroyed; at other times a slough forms in a considerable portion of the cornea at once, and opens into the anterior chamber.

Treatment. Depends on the stage of the complaint. During first stage, general bloodletting must be resorted to, and all other antiphlogistic treatment must be put in practice. Drastic purgatives, diaphoretics, moist warmth, in shape of poultices, should be applied to the affected part.

In the chronic stage, when the conjunctiva is feebly pouring out pus, pulse depressed; skin cold and clammy; countenance sallow; and when the constitution has materially suffered, gently stimulating applications, by means of the syringe, so as to cleanse the conjunctiva, should be resorted to. Tonics should be administered.

In **Purulent Ophthalmia of infants,** the principal difference between it and that of adults is in the different state of the conjunctiva. In infants, the quantity of matter is often profuse; the inflammation is rarely considerable; in adults the inflammation is violent, with tumefaction of the conjunctiva.

Treatment. In the first stage, a simple antiphlogistic plan is likely to succeed. Leeches may be applied, blister to nape; keep child in cool room, and administer a gentle purge. When the inflammatory stage is over, astringents are indicated; if poultices are used, one made of curds of milk turned with alum, and an equal part of ung. sambuci, or ung. aqua rosæ, is recommended.

A drop of a solution of one grain of nitrate of silver to an ounce of water may be put in the eye twice a day; or lotion of alum, gr. iv, to water ℥j, may be used; afterward smearing the lids with lard, or some mild unguent, to prevent them from adhering.

Perfect cleanliness must be insisted on.

Gonorrhœal Ophthalmia, produced by the application of gonorrhœal matter to the conjunctiva, is one of the most violent forms of purulent ophthalmia

This produces the most intense degree of inflammation, and it seems to differ from purulent ophthalmia only in the symptoms being more violent.

Treatment. Blood should be taken, both topically and locally; mild laxatives; blisters to the nape. The eyes should be fomented with a decoction of poppies, and warm milk injected under the lids. A brisk purge may be given. Cold lotions should be applied over the eye, and these, together with cleansing the eye, by means of a syringe, with tepid water, should be constantly renewed.

If there is hard chemosis overlapping the cornea, it should be freely incised. As soon as the acute inflammatory stage is reduced, an astringent to the conjunctiva is indicated. At this period of the disease tonics must be freely administered.

OPACITY OF THE CORNEA.

1. **Nebula,** or simple opacity of the cornea, is recognized by a diffused cloudiness of the whole or part of the cornea; it has no distinct boundary, but gradually loses itself in the transparent part of the tunic. The opacity is greater in its centre, and is generally seated directly beneath the conjunctiva.

2. **Leucoma.** The opacity is more circumscribed and of a whitish, chalky or pearl color. It is deeper seated than the preceding, and assumes a polished or shining lustre; if more superficial the color is dead. When the disease occupies the centre of the cornea, so as to obstruct the entrance of the rays of light into the pupil, the patient is rendered completely blind.

3. **Albugo.** This species is always the consequence of a wound or ulcer of the cornea.

Treatment is generally of the chronic kind; the disease arises from a relaxed state of the vessels, which require stimulating applications, so that *they may recover* their tone and convey the blood uninterruptedly. A good stimulus to be used is one containing sulphate of zinc, beginning with a grain to an ounce of water and gradually increasing.

To relieve the intolerance of light, and spasm, warm belladonna or opiate lotion, small blisters behind the ear, and the administration of conium, or of belladonna in small doses are recommended.

Pustules are generally seated at the junction of the transparent with the opaque cornea, but they sometimes occur in the cornea itself, or on the conjunctiva covering it.

The appearances they present at first are red or yellowish spots, arising from a deposit of lymph in those parts, and are slightly elevated. There is considerable turgescence of the vessels around them. If they occur on the cornea, it will be nebulous and opaque; the vessels around the cornea will be seen distended, carrying red blood and having a radiated disposition.

If the lymph secreted is not absorbed, the pustules break, matter escapes and ulcers form; there may be one or more of these ulcers.

Treatment. If there is much inflammation, the surgeon must resort to depletion; if the inflammation is chronic, tonics must be used. Leeches, if required, must be applied; blisters will be useful, and a resort must be had to astringent collyria early in the disease; vinum opii is one of the best.

PTERYGIUM.

Pterygium is a preternatural, reddish, ash-colored, triangular little membrane, which most frequently grows from the internal angle of the eye, near the caruncula lachrymalis, and gradually extends over the cornea, so as to cause considerable impediment to vision. It is most common in warm climates.

Treatment. When the disease is increasing, and has proceeded on to the transparent part of the eye, excision is to be performed. Raise the membrane near to the cornea with the tenaculum, and cut it through while suspended, and then dissect it off.

INFLAMMATION AND ULCERATION OF THE CORNEA.

Inflammation. At the outset there is a hazy appearance, the cornea loses its natural lustre, and in a short time there may be discovered on its surface vessels carrying red blood, and then the symptoms will be those of inflammation in general; effusion of tears and intolerance of light will be present.

If inflammation continue, matter frequently forms between the lamella, giving the appearance known as onyx or unguis.

Ulceration of the cornea is the common consequence of inflammation, but is frequently produced by the contact of matter in purulent ophthalmia. The inflammation produces the formation of pus; and an ulcer is formed.

Treatment is that of inflammation of the conjunctiva; antiphlogistics at the outset; and when the inflammation is subdued, use mild astringent collyria.

When ulcers form, use active means if they are accompanied by acute inflammation; when they show a tendency to spread, astringent lotions will be of great service; the nitrate of silver, in the proportion gr. ij to water ℥j, is one most relied upon. The general treatment is alterative and tonic, iodide of potassium, iron, etc.

IRITIS.

Inflammation of the Iris involves the sclerotic, the anterior capsule of the lens and the retina; it, therefore, may be termed ophthalmitis, or deep-seated inflammation of the globe of the eye.

Symptoms. At first the fibrous texture of the iris is indistinct, confused, and loses its color; if dark, it becomes reddish; if blue, greenish. The pupil loses its mobility; is contracted and irregular; in the next stage the lymph begins to be effused. The eye exhibits the redness arising from vascularity of the sclerotic; it is pinkish, with vessels running from a straight line from the circumference of the eye and terminating around the cornea. Sometimes the cornea is slightly hazy. There is intolerance of light with dimness of vision, and a burning, stinging pain in the eye.

The most frequent variety is syphilitic iritis; distinguished by the effusion of lymph on both surfaces of the iris, and by little nodules of a dirty brown color, which cause the pupil to become irregular.

Treatment. Subdue inflammation; arrest effusion of lymph, and cause the absorption of that already effused.

If the patient is strong and robust, and the disease acute, with much fever, leeches or cupping to the temples may be requisite. Purgatives employed early. To arrest effusion of lymph, calomel, gr. j–ij, with opium, gr. ¼ to ½, at intervals of six or eight hours. The dose should be lessened as soon as the mouth begins to be tender. The pupil should be kept well dilated, by means of a solution of the sulphate of atropine (gr. j to ℥j aq. destil). *Or the extract of belladonna may be smeared around the orbit.*

CATARACT.

Cataract is an opacity of the crystalline lens, or of its capsule, or of both.

Symptoms. There is defect of vision from the first; the patient sees things through a mist, and requires a strong light to see them plainly; this symptom changes as the disease progresses; the patient being able to see better in a moderate than in a strong light, and then a speck or opacity in the lens or capsule is observed; it is generally in the centre of the pupil and at the situation of the lens; this gradually enlarges, and in proportion as the opacity increases, the sight becomes more dim and the capability of discerning objects diminishes. There are several kinds of cataract:—

1. **Hard Cataract.** The lens acquires a greater degree of density or firmness than is natural; it is known by its amber color and size. The motions of the iris are free, there being no adhesions; the vision is more or less good, and it occurs at an advanced period of life.

2. **Soft Cataract.** This kind is the consistence of firm jelly or cheese; it is uniformly opaque, and there is a milky whiteness; the lens becomes increased in size; the posterior chamber of the eye becomes obliterated; the motions of the iris are performed with difficulty. In many, though not in all, cases the patient cannot distinguish between light and darkness.

3. **Congenital Cataract** is a variety of the soft cataract.

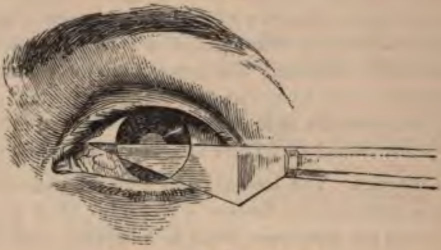
4. **Membranous Cataract.** The opacity or affection may exist either in the posterior or anterior layer of the capsule, or combined with that of the lens; if the anterior layer of the capsule is opaque, it has the appearance of being superficial and close to the pupil, and appears rather nebulous. When the posterior layer is affected this appearance is deeper.

Treatment. Cataract requires an operation to relieve it. It is a general rule not to operate till the cataract is *mature*, more particularly if the patient is old and feeble, or if one eye is already lost.

The operations usually resorted to are, 1st, by *extraction*, and 2d, by *solution*.

1st. *Extraction:* The operator, with the forefinger of the non-operating hand, raises the upper lid, and locks it under the edge of the orbit; then, holding the knife lightly with the thumb and first two fingers of the other hand, and resting the hand against the side of the face, he commences by puncturing the cornea at the centre of its outer margin, half a line or less from the sclerotic; the blade is pushed slowly, carefully and gently across, parallel with the iris, in such a way that the point shall penetrate the other side of the cornea exactly opposite to the first puncture, and that the edge shall cut an even, semicircular flap of the upper half of the cornea. When the incision is completed, the eyelids should be dropped and all pressure cease. Having waited a few seconds, the surgeon lifts the upper lid sufficiently to expose the cornea, directs the patient to look downward, then introduces the curette and freely lacerates the capsule of the lens; he makes *very gentle* pressure on the under part of the globe, and on the upper eyelid, till the lens rises through the pupil and escapes.

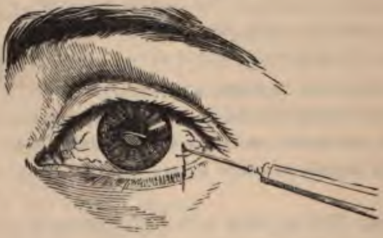
FIG. 56.



EXTRACTION OF CATARACT.

After Treatment. The patient should be put to bed, with shoulders raised, the room darkened and well ventilated. The bowels should be kept open and everything avoided that is likely to provoke coughing, sneezing or vomiting. Diet should be moderate. The eye may be opened on the seventh day, if all goes well, and if the cornea is united he may get up occasionally, remaining in a darkened room. After about a fortnight the eye may be naturally opened and gradually brought into use.

FIG. 57.



NEEDLE OPERATION FOR CATARACT.

The greatest care must be observed not to expose the patient to cold, or over exertion of the eye. Convex glasses for exact vision will be needed, but they must be used sparingly for some weeks.

The operation for producing solution and absorption is very easily performed, and excites very little inflammation, but it requires to be repeated several times, and the cure occupies some weeks or months.

The needle is passed through the cornea, close to its margin, and is made to lacerate the capsule to the extent of the pupil, so as to admit the aqueous humor to the substance of the lens; but without displacing or cutting it into fragments, or, in fact, attempting to do too much. The operation is apt to be followed by pain.

If the cataract is so fluid that it mixes readily with the aqueous humor, the contents of the anterior chamber should be evacuated.

PHIMOSIS AND PARAPHIMOSIS.

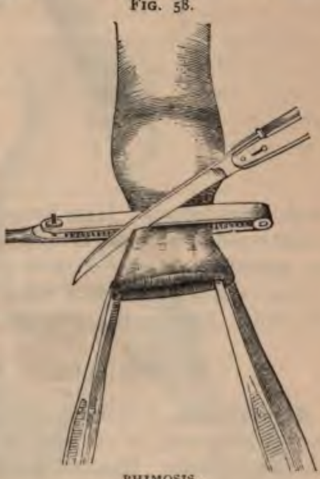
Phimosis is a constriction of the prepuce, which prevents the glans from being uncovered.

It may arise from inflammation of the cellular tissue and effusion of serous matter into it; it is frequently the result of chancre.

If congenital, this disability may be removed by gradual dilatation with sponge tents, or daily distention.

For radical cure, the operation for circumcision may be performed. If this operation is performed, the end of the foreskin must be drawn out; held between the blades of the forceps and then cut straight off, after which the mucous lining should be turned up so as to uncover the glans. Sutures should be passed through the margin of the incision, to draw together the edge of the skin and the mucous lining of the prepuce.

FIG. 58.

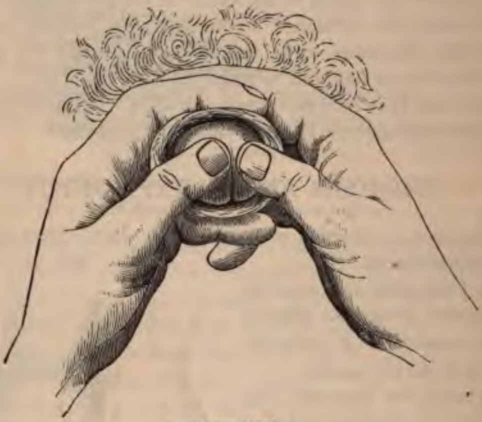


PHIMOSIS.

Paraphimosis is a constriction of the prepuce from inflammation, so that the skin having been pulled back, cannot be drawn again over the glans penis.

Treatment. The object is to reduce the strangulated part as quickly as possible. The penis being greatly distended with blood; take hold of the glans between the fingers, and endeavor to empty the vessels by gentle pressure. When this has been continued for a few moments, endeavor to reduce it by pushing the glans back, and at the same time drawing the skin or the penis forward. If the paraphimosis is not relieved by this treatment, it will be necessary to divide the stricture with a bistoury. Do this by separating the skin on each side, then insert a director under the stricture and divide it, which will allow the skin to be readily drawn over the penis. Then apply cooling lotions.

FIG. 59.



PARAPHIMOSIS

HYPOSPADIAS AND EPISPADIAS.

Hypospadias, a malformation, in which the canal of the urethra, instead of opening at the apex of the glans, terminates at the base or beneath the penis. Hypospadias is ordinarily incurable.

Epispadias is the opposite of hypospadias; *i. e.*, it is a preternatural opening of the urethra at the upper part of the penis. The patient may be benefited by a plastic operation, depending on the case.

HYDROCELE.

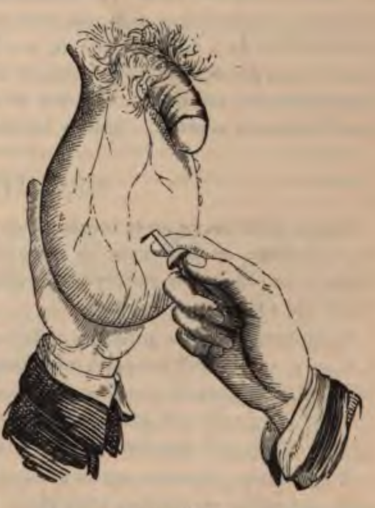
Hydrocele is an accumulation of serum in the tunica vaginalis testis. It may be of the tunica vaginalis, and of the spermatic cord.

The swelling in hydrocele of the tunica vaginalis first shows itself at the lower part of the scrotum, and gradually rises till it arrives at the abdominal ring; is of a pyriform shape; it is largest two-thirds of the way downward, less at the bottom, and smallest at the ring. Usually it is unattended with pain. Commonly there is no discoloration of the scrotum. The ordinary situation of the testicle is two-thirds of the way down the tumor at the posterior part, but it may sometimes be found in front, or at the bottom.

The diagnostic signs are a sense of fluctuation, transparency, lightness, freedom from pain. In very old cases the tunica vaginalis becomes much thickened and the transparency may be absent.

Congenital Hydrocele. When the tunica vaginalis preserves its communication with the abdomen, and then becomes filled with serum, forming a cylindrical tumor, extending to or through the abdominal ring, it is called congenital hydrocele. On being raised and compressed the fluid is slowly squeezed into the abdomen and slowly trickles down again afterward.

FIG. 60.



HYDROCELE.

Treatment is either palliative or curative.

The evacuation of the serum constitutes the palliative treatment.

This is accomplished by a puncture with a grooved needle, or a small trocar and canula. Palliative treatment is sufficient for children, but rarely so in the case of adults.

The *radical cure* is performed by injecting stimulating fluid or introducing setons into the tunica vaginalis. The radical cure is not admissible if the testis is diseased, or the hydrocele is accompanied by irreducible hernia.

Operation. The surgeon grasps the tumor behind and passes a trocar and canula into it, pointing the instrument slightly upward, to avoid injuring the testicle. He withdraws the trocar and allows the fluid to escape. When the sac is emptied, a fluid composed of one drachm of tincture of iodine and one or two drachms of water is injected through the canula into the sac. When the inflammation subsides the fluid generally secretes no longer.

HÆMATOCELE.

Hæmatocele is an extravasation of blood into the tunica vaginalis.

Generally occurs as an immediate consequence of injury of the scrotum; sometimes it arises without any assignable cause.

There is swelling of the part, which comes on immediately or soon after the receipt of the injury; it resembles hydrocele, as regards shape. At first the tumor is soft, and fluctuation may be detected, but when the blood coagulates it resembles in its character a solid growth.

Treatment. In a recent case the first indications are to arrest the flow of blood and relieve pain. The horizontal posture, with testicles raised, is necessary; the iced bag and cold lotions must be applied; if the blood remains fluid for a long time tapping may be performed. In chronic cases, where there are signs of suppuration, a free incision should be made into the vaginal sac, and the cyst and the clots turned out. Then follow the usual treatment to promote healing by granulation.

ORCHITIS.

Acute orchitis, or acute inflammation of the testicle, may be caused by local violence, or may occur in conjunction with gonorrhœa; and it is liable to be induced by employing injections and at the same time neglecting to use a suspensory bandage.

Symptoms. If the patient is suffering with gonorrhœa the discharge will cease and he will complain of aching pains in the testes and cord, followed by tenderness, swelling, fever, and frequently vomiting. The part first and chiefly affected is the epididymis. The swelling arises mainly from an effusion of lymph and serum into the tunica vaginalis.

Treatment. Absolute rest in the recumbent posture; leeches over the cord, and opium at night, to allay pain. Purgatives, warm fomentations, and a suspensory bandage, to elevate the parts on the abdomen.

When the acute stage has subsided, strapping, by the application of *adhesive strips*, should be employed.

Chronic orchitis (sarcocele) may succeed an acute attack or it may arise spontaneously. The exciting causes are chronic cystitis, hypertrophy of the prostate gland, stricture and gonorrhœa.

If the exciting cause is still in operation it must, of course, be removed; the patient should be confined to his back and put on the use of iodide of potassium; if this does not answer he should be mercurialized, using for the purpose calomel, blue mass, or protiodide of mercury.

VARICOCELE.

Varicocele is a varicose state of the veins of the spermatic cord. It is more common on the left side.

Treatment. Keep bowels open; wash the scrotum frequently with cold water; support scrotum with suspensory bandage.

For radical cure it is recommended to pass a ligature subcutaneously, so as to divide veins only and not the skin. Operations on the veins are always attended with some risk.

CARCINOMA OF THE TESTICLE—CASTRATION.

This is generally of the soft variety. Gland swells, becomes hard, heavy and elastic; at this period it is scarcely painful or tender, and merely causes slight aching in the loins, from its weight. After a time it enlarges rapidly and feels soft; the cord swells; the pain becomes severe and darting. Secondary tumors form in the iliac fossa, and emaciation, exhaustion and death follow.

Castration. The method of performing the operation is as follows: The scrotum being shaved, the operator grasps it behind, so as to stretch the skin, and makes an incision into the tunica vaginalis, to examine the testis. If there is no doubt of the diagnosis the cut is extended to the bottom of the scrotum. If the tumor is very large, two elliptical incisions may be made, to remove a portion of the skin between them; then separate the cord from its attachments; an assistant holding it between his finger and thumb, or with a stout pair of forceps, to prevent it retracting when cut; a long, stout ligature being passed through its connective tissue, so that in the event of secondary hemorrhage, the cord may at any moment be pulled out. Then pass the bistoury behind the cord and divide; and seizing the lower portion dissect out the testicle. All arteries requiring it are to be tied, and the wound is not to be closed until all bleeding has ceased, as there is frequently secondary hemorrhage.

HEMORRHOIDS.

Hemorrhoids are tumors situated near or in the anus, and are distentions of hemorrhoidal veins, with inflammatory swelling, congestion and hypertrophy of the mucous or submucous tissue.

Piles are either external or internal; if situated within the rectum they are denominated internal; if they are seated on the verge of the anus they are called external.

If they are attended with discharge of blood they are called *open* or *bleeding piles;* when there is no discharge they are denominated *blind piles.*

The symptoms of external piles are pain when passing fæces, or tenesmus after discharge; at first there is a projection of a livid appearance, which in a few days becomes solid; the blood becomes coagulated in the hemorrhoidal veins. In a few days the pressure of the fæces brings down the pile, and it becomes external. When inflammation comes on the patient suffers greatly, and can only be tolerably comfortable in a recumbent position.

Treatment of External Piles. If consulted early, while the pile is only a livid projection, an active purgative should be administered, avoiding such as have particular influence on the rectum, such as aloes. Leeches may be applied in addition. As a local application liquor plumbi acetatis is highly commended.

If the pile has continued until it has become solid, insert a lancet into it, and press out the clot; then apply a cooling lotion, administer a purgative, and the patient will be rid of the disease.

Internal Piles are frequently accompanied by a high degree of fever, with a sense of weight and pain in the sacrum; pressing at stool causes the disease to show itself by prolapsus ani.

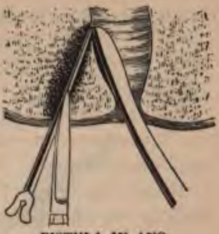
Treatment. The irritation must be relieved by general and local treatment. Apply leeches and fomentations; if these measures do not cause relief, the piles must be removed by ligature.

FISTULA IN ANO.

This is a fistulous ulcer by the side of the rectum, through the fibres of the sphincter ani.

There are three kinds recognized in books: 1. The complete fistula, which has one external opening near the anus and another in the bowel above the sphincter. 2. The blind, or incomplete external fistula, which

Fig. 61.



FISTULA IN ANO.

has no opening in the bowel. 3. The blind, or incomplete internal fistula, which opens into the bowel, but not externally.

Treatment consists in the division of the sphincter ani, so as to prevent the contraction of that muscle for a time. Before operating, the digestive organs must be put in good order, and a purgative must be administered, so that the bowels may not be disturbed for two or three days.

PROLAPSUS ANI.

This is an eversion of the lower portion of the rectum, and its protrusion through the anus. The affection is most common in infancy and old age. It may come from straining or from natural laxity.

Treatment. The parts should be carefully washed, and then replaced by gentle pressure with the fingers. If there is any difficulty, the forefinger, well oiled, should be pushed into the anus, when it will carry the protruded part with it, after which a thick compress, saturated with some astringent lotion, should be bound to the part by means of a T bandage. The bowel is to be kept in its place by means of quietude and the recumbent posture, and, if necessary, tonics should be resorted to. Lotions of a solution of alum, sulphate of zinc, decoction of galls, and astringent injections are to be employed, if necessary,

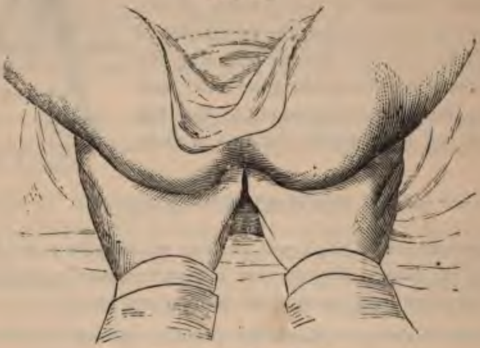
FISSURE OF THE ANUS.

This is a small chap, crack, or ulcer, which gives intense pain during defecation, frequently continuing for some time after the evacuation. It may be the remains of an external pile, and is generally situated behind it, and leads to the fissure.

Purgatives frequently give relief, and lotions of sulphate of zinc, of tannin, nitrate of silver, or sulphate of copper, are often beneficial; an ointment of galls with lead may be tried. Should these remedies not answer, *forcible dilatation* may be resorted to, so as to temporarily paralyze the sphincter muscle. To accomplish this, the two thumbs, well oiled, must be introduced into the rectum, and then, by firmly grasping the nates with the fingers, the sphincter muscle is dilated, by drawing the thumbs apart.

Should this means fail, an incision into the part should be made, through the fissure or ulcer, with a straight, narrow, blunt-ended bistoury, so as to divide the mucous membrane, and in severe cases, to divide the sphincter.

FIG 62.



FISSURE OF THE ANUS.

A small piece of lint should be laid in the wound, so that it may heal by granulation.

CARCINOMA OF THE RECTUM

May commence as a distant tumor, or as an infiltration into the walls of the bowel, causing stricture. The earliest symptoms are uneasiness in the rectum, aching spasm in the back, hips and thighs, and irritation of the bladder. As the disease advances, the bowel becomes more or less obstructed; there is frequent discharge of a fetid, muco-purulent matter, streaked with blood, and obstinate constipation attended with swelling of the abdomen, and sometimes with the symptoms of acute obstruction. There may be profuse and exhausting diarrhœa. Peritonitis, or perforation of the distended bowels, with exhaustion, terminate the patient's suffering in death.

Treatment. Keep up the action of the bowels by enemata of warm water and very mild laxatives; allay irritation by occasional leeching, by belladonna and opiate applications, suppositories or enemata. The patient's strength is to be sustained by tonics, cod-liver oil, etc., etc.

VARICOSE VEINS.

Varix is an enlarged and tortuous state of the veins, which are usually *thickened, rigid,* and formed into irregular pouches.

It is most frequently seated on the lower extremities, scrotum and rectum.

Varicose veins of the leg are accompanied by pain, weight, fatigue on taking exercise; they cause ulcers and excoriations of the skin; they sometimes burst, causing profuse hemorrhage, and occasionally the blood clots in the veins, which may terminate in an abscess.

Treatment. The *palliative* treatment consists in applying strips of leather over the part, a common roller, as Martin's roller, or an elastic stocking, which should be applied in the morning, before the patient rises. Galvanism or faradization has been recommended.

For the *radical* cure many methods have been devised; Sir B. Brodie recommended division of the vein by *subcutaneous* section; Watson, of New York, advocates *excision* of a portion of the affected vein; again, potassa fusa and quicklime, to cause slight inflammation, has been suggested. Pressure and the twisted suture both have their advocates.

CLUB FOOT.

This is a deformity of the foot, produced by rigidity and contraction of various muscles of the leg.

Talipes Equinus is where the heel merely is raised, so that the patient walks on the ball of his foot.

Talipes Varus. The heel is raised, the inner edge of the foot is drawn upward, and the anterior two-thirds twisted upward, so that the patient walks on the outer edge, and in extreme cases on the dorsum of the foot and outer ankle.

Talipes Valgus. The outer edge of the foot is raised, the longitudinal or inner arch flattened by the sinking of the head of the astragalus, and the patient walks on the inner ankle.

Talipes Calcaneus. The toes are raised and the heel is depressed, so that the patient walks entirely upon it. There are also compound varieties, which need not be enumerated in a work of this kind.

These deformities may all be congenital, or they may appear after birth.

Contraction and shortening of the muscles are the causes of club foot. In non-congenital cases they may be brought on by spasms affecting many muscles, which may be dependent on a rheumatic fever, or produced by irritation directly from the spinal cord, or they may be sequelæ of bruises, injuries or diseased joints.

Treatment. In recent cases remove all irritating causes, soothe spasms, stimulate palsied muscles. If the case comes under the surgeon's notice before the contracted muscles become fixed, use constitutional remedies, fomentations, etc. In slight cases light splints of gutta-percha or wood, with bandages, may be of service.

In severe cases it is better to resort to Stromeyer's operation of *subcutaneous tenotomy*. By this operation the mechanical shortening of the muscle is obviated; the tendon being divided, its separated extremities heal by a new connective tissue, which renders it longer, and may be readily stretched while recent.

To perform the operation, the tendon is put on the stretch, and a narrow, sharp-pointed tenotomy knife is thrust through the skin on one side of it, then its edge is turned against the tendon and made to divide it as it is being stretched. Some surgeons prefer to pass the knife under the tendon, and then cut toward the skin, and others pass it between the tendon and the skin and cut toward the deeper parts.

In talipes equinus the tendo-Achillis is cut.

In talipes varus the tendo-Achillis, tibialis posticus, anticus and flexor longus digitorum.

In valgus the peronei and the extensor longus digitorum.

In some cases it may be necessary to cut a portion of the plantar fascia, or the muscles of the sole of the foot.

INGROWING TOE NAIL.

This affection is most frequent to the great toe; the incurvation usually exists on both sides, though more frequently on the inner side. It is generally a source of great suffering, on account of the pressure exerted on the soft part at the side of the toe, which swells, ulcerates and discharges a foul, fetid fluid, and is covered with tender granulations.

It may arise from an abnormal formation of the nail, but it is frequently produced by the use of tight, narrow shoes.

If the disability is slight the patient may be relieved by the persistent use of scraped lint being inserted under the nail, a small roll of linen laid between the nail and the overlapping skin, and then applying a strip of adhesive plaster so as to keep the parts asunder. In severer cases the most reliable method is to excise the edge of the nail. With a strong scalpel the nail is divided its whole length, on a line with the incurvated edge, which is then detached, root and all being embraced in the operation. Warm water dressing or opiated water is then applied and the part [illegible] at rest.

HOUSEMAID'S KNEE

Is an inflammation of the bursa of the knee, between the patella and skin, which is common to housemaids, from kneeling. It is usually chronic, but may be acute. It causes great pain and swelling; it differs from inflammation of the synovial membrane by the swelling being more superficial, and in being in front of the patella, which is obscured by it; in inflammation of the synovial membrane of the knee, the patella is thrown forward, and the swelling is most prominent at the sides.

Treatment. Rest, leeches, fomentations and purgatives; if these do not bring relief, an incision should be made into the swelling. After evacuating the contents of the sac, a small quantity of equal parts of tincture of iodine and alcohol should be injected into it. Dr. Levis recommends injections of carbolic acid.

WHITLOW.

Paronychia or **Whitlow** is an abscess of the thumb or fingers.

The superficial whitlow consists of inflammation of the surface of the skin of the last phalanx, with burning pain or effusion of a serous or bloody fluid; it is generally seated immediately around and beneath the nail; it is attended with great pain and throbbing, and suppuration at the root of the nail, which may come off.

The deep-seated variety, or *tendinous whitlow*, as it is called, is attended with severe, throbbing pain, exquisite tenderness; slight, but tense and resisting swelling, and very great constitutional disturbance. It may lead to suppuration, the matter extending itself along muscles and tendons from the fingers to the palm, and even to the forearm, causing sloughing of the tendons, with severe irritative fever, sometimes placing life in danger and frequently leaving the limb stiff and useless.

If purgatives and fomentations do not speedily bring relief, the finger must be freely laid open. The knife, used early, should be carried deep enough to feel the resistance of the bone or tendon; the sheath of the latter should be thoroughly laid bare. If the matter has extended to the hand, an opening should be made until complete drainage is established.

DROWNING.

Treatment of Drowning. Let the head hang for *ten seconds*, so that any water may run out of the mouth; then lay down the body with the head raised; put the fingers in the mouth and draw the tongue well forward; wipe out the mouth and throat; strip off the wet clothes; wipe all parts of the body perfectly dry with warm cloths. If breathing has not quite ceased, rouse the circulation and respiration by friction of the entire surface, occasionally dashing cold water on the face, neck, and chest, and then wiping quite dry with a warm towel, and by tickling the nose and fauces, to excite sneezing, coughing or vomiting. If breathing should not be thoroughly resorted to by these means artificial respiration should be resorted to. There are several methods recommended.

1. **Abdominal and Thoracic Pressure.** The operator kneels by the patient and places his hands near together, with the fingers pointing toward the head, the two thumbs approaching a little beneath the lowest point of the sternum, and the balls of the thumbs lying in the epigastrium, about three inches apart; the lower and thick part of the hand is firmly pressed downward, and as this part of the hand descends the fingers exert firm pressure on the lower part of the thorax. The pressure is continued until *one, two, three* be counted without hurry, when the hands are suddenly raised from the lower part first; and the chest, which has been emptied by the compression is allowed to refill with air by its own elasticity. The process is repeated as often as necessary.

2. **Chest Pressure.** Professor Howard's plan: The patient is laid on his back, with a roll of clothing beneath the loins, so as to make the short ribs bulge prominently forward, and raise them a little higher than the level of the mouth. The arms are then stretched forcibly back over the head, crossed and held in this position by an assistant, who also holds the tip of the tongue over one corner of the mouth, grasping it with a dry handkerchief. The operator then kneels astride the patient's hips, and, with his hands resting on the stomach of the patient, spreads out his fingers so as to grasp the waist about the short ribs. He next throws all his weight steadily forward upon his hands, while at the same time he squeezes the ribs deeply, " as if he wished to force everything in the chest upward out of the mouth." This pressure is continued while *one, two, three* can be slowly counted, when it is suddenly removed with a final push, which springs the operator back to his first kneeling position. After an interval, during which *one, two, three*, can be slowly counted, the pressure is repeated and the process continued as long as necessary.

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